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VOLUME 24, 1934

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THE NATION'S HEALTH

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Official Monthly Publication of the American Public Health Association

Volume XXIV

January, 1934

Number 1

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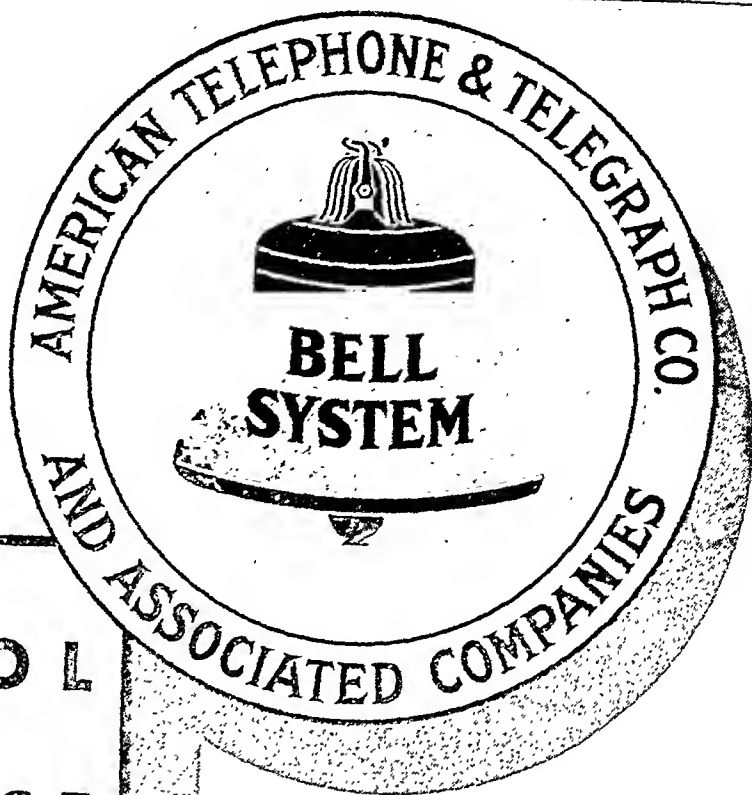
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Results of 3½-Year Clinical Study of 440 Children

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DENTAL CARIES, Incidence	78.0%	33.7%	83.4%

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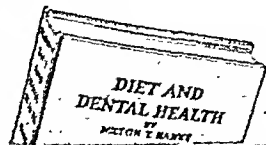
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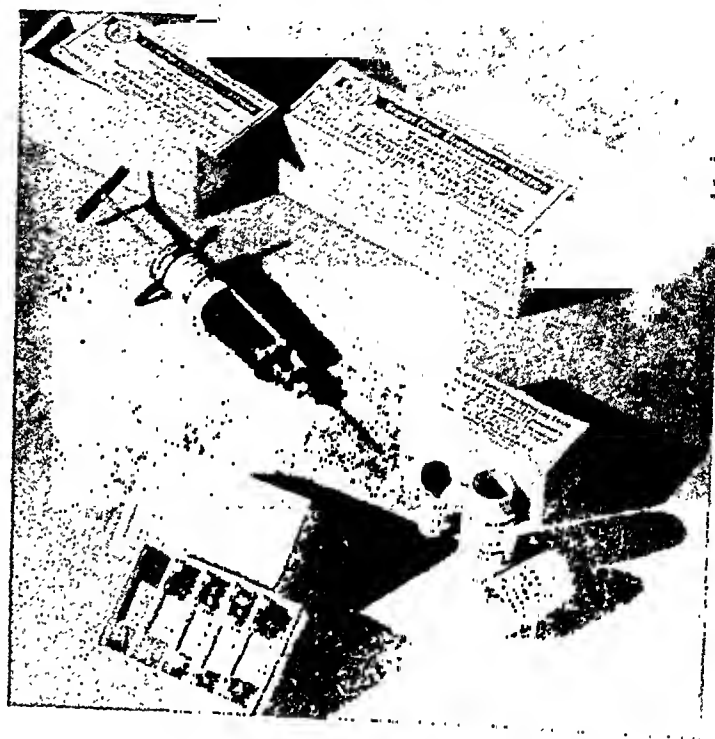
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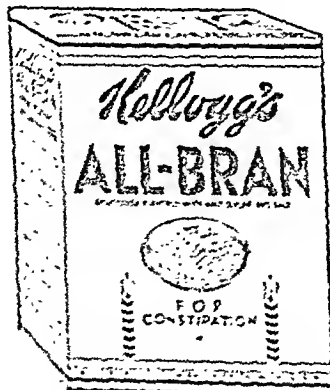
TO PROTECT the buying public, the United States Food and Drug Administration has advised that every package of cereal labeled "Bran" state on the label exactly what it contains. If less than 50% of the cereal is actually bran, the definite percentage should be printed plainly on the carton. If other parts of wheat are included, a qualifying phrase explaining this should be added.

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* These products, while mildly laxative in character, are popular mainly as delicious, healthful ready-to-eat cereals—and are not recommended primarily for the relief of constipation.

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High-Citrus Diet Reduces Gingivitis 83%, Caries 57%

Results of 3½-Year Clinical Study of 440 Children

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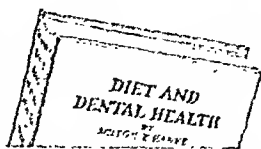
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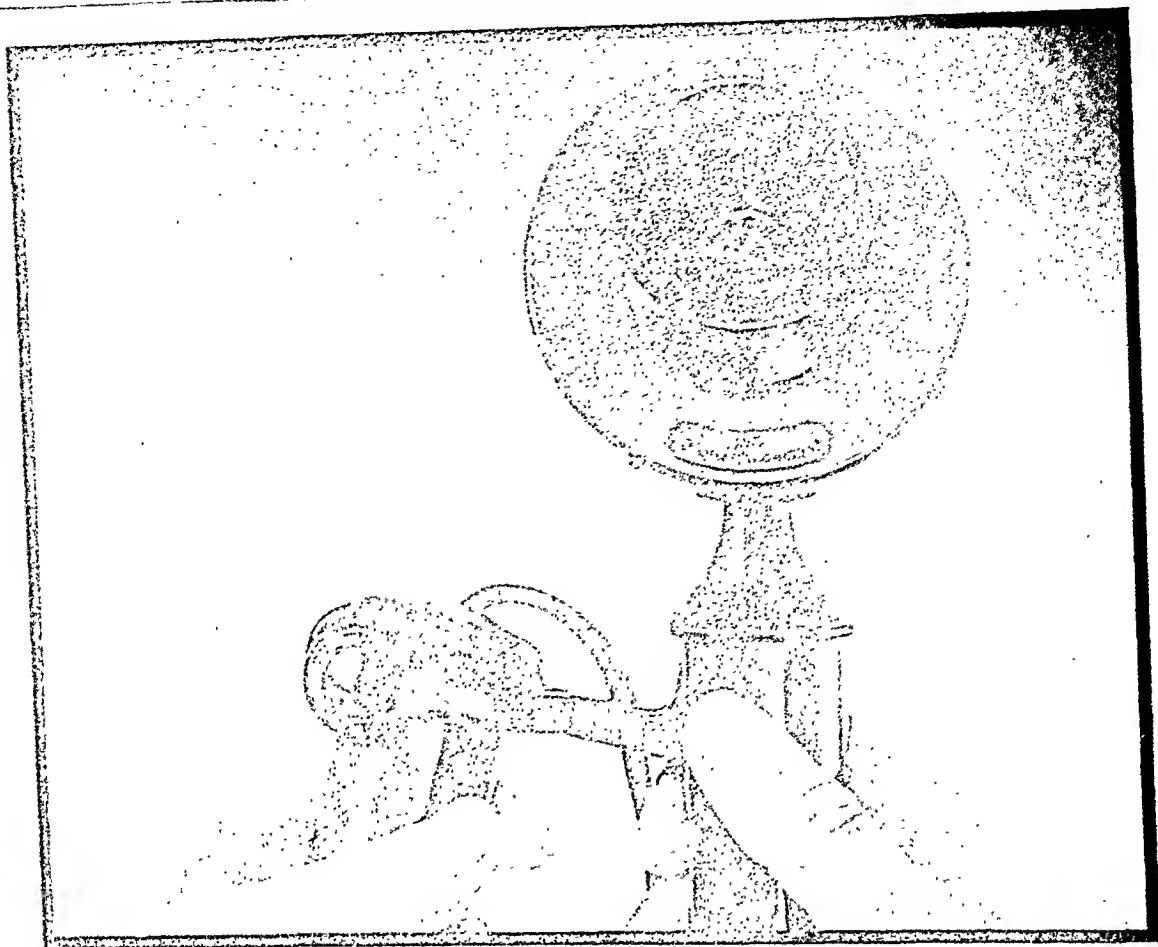
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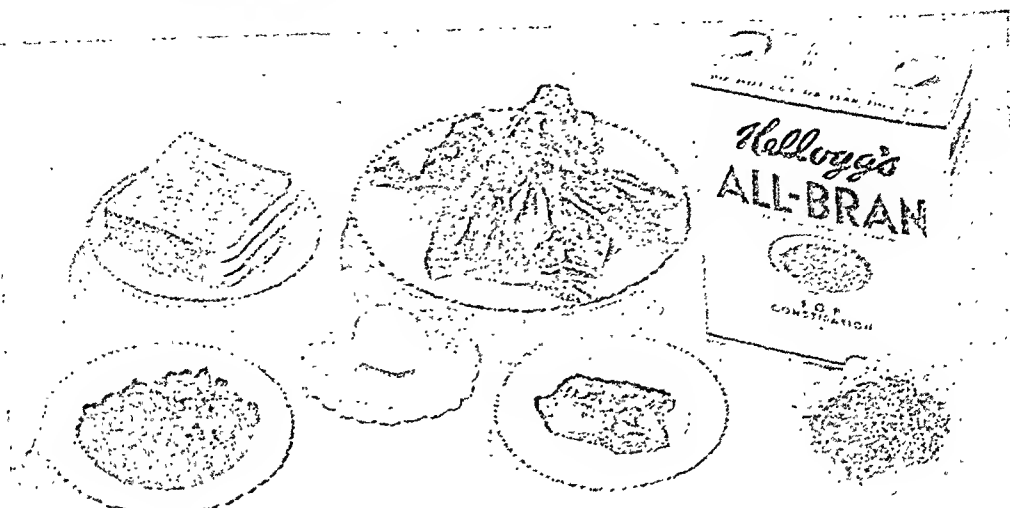
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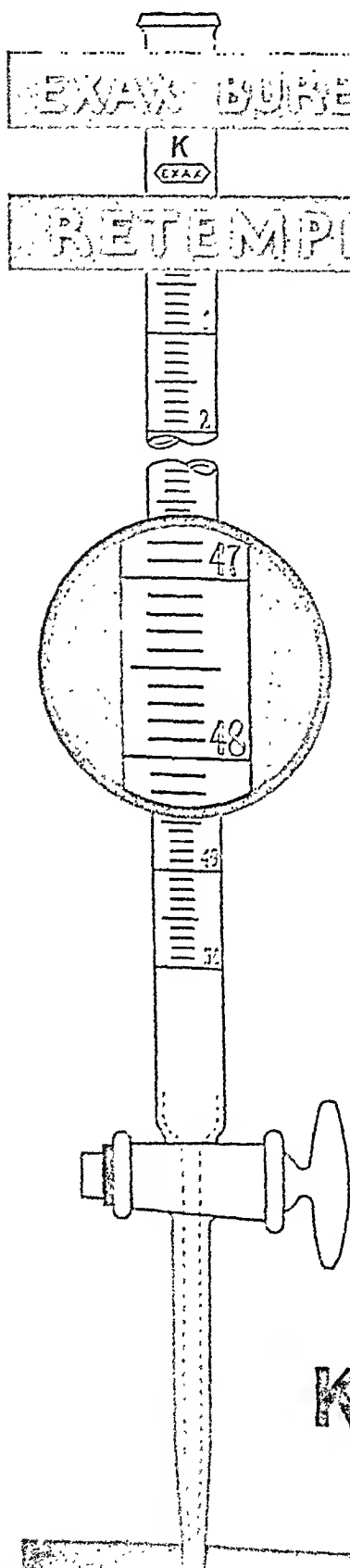
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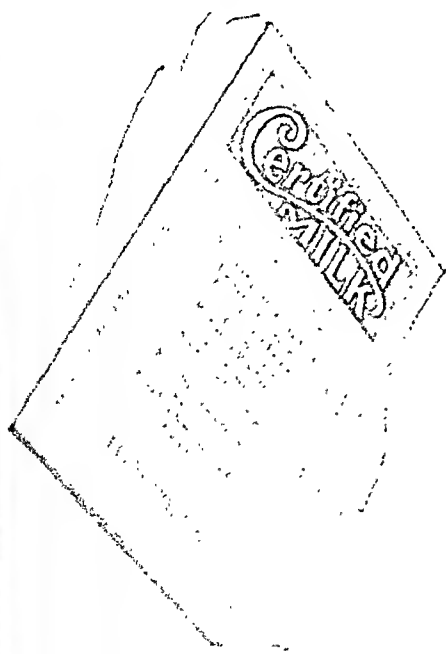
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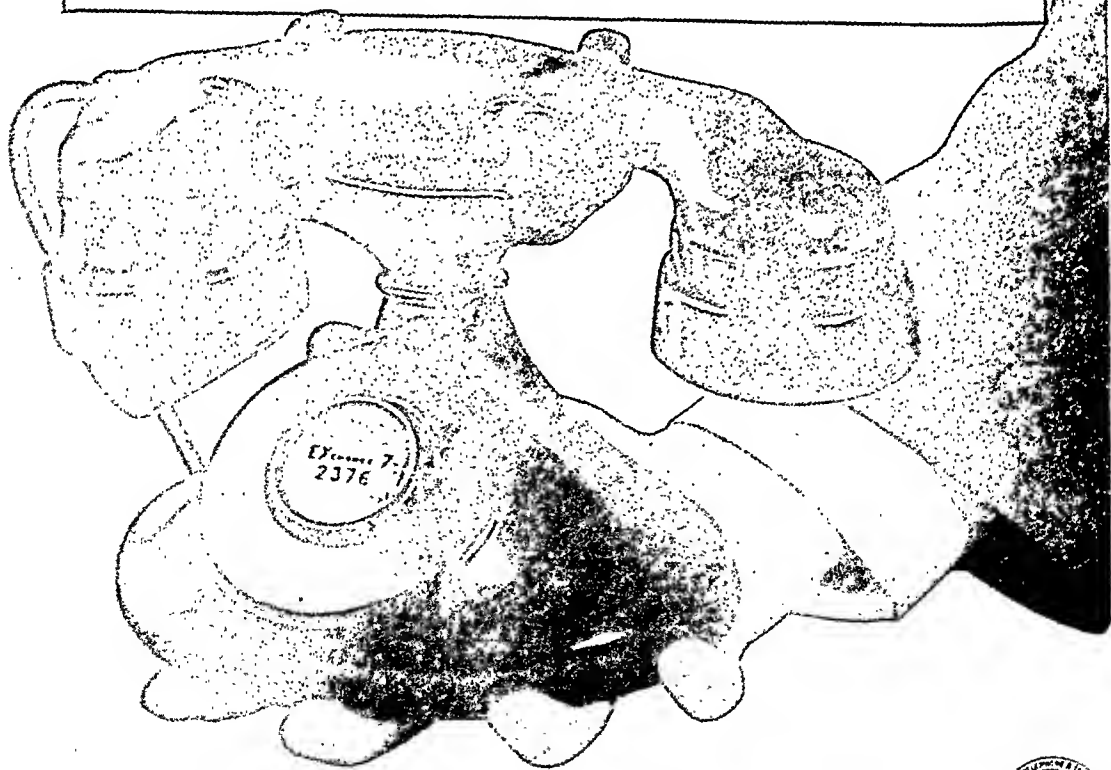
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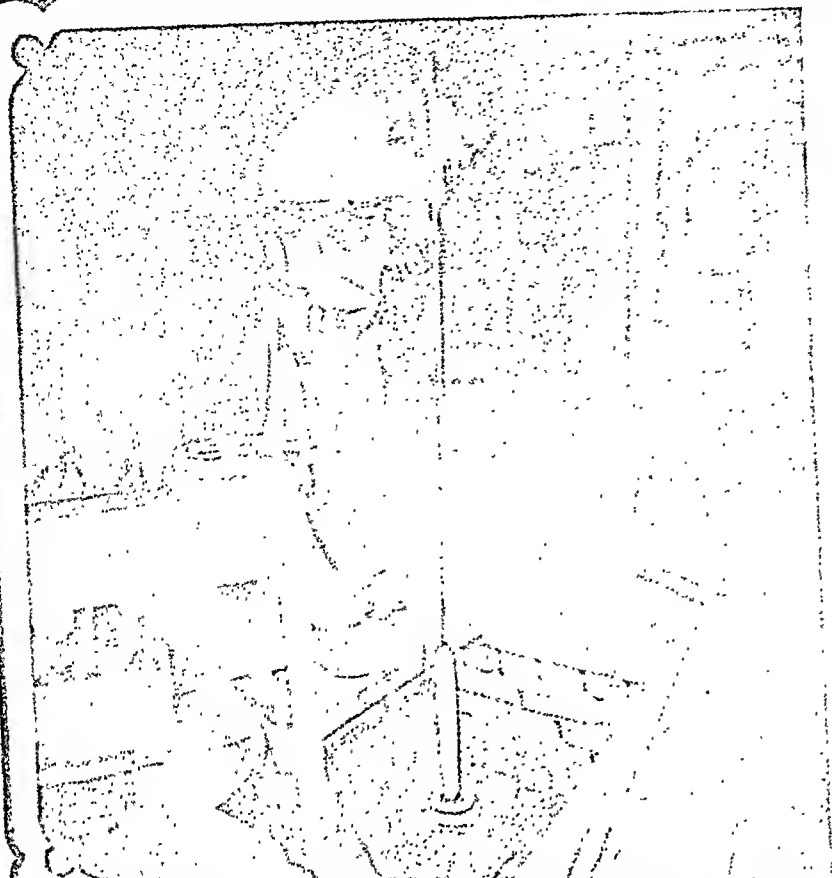
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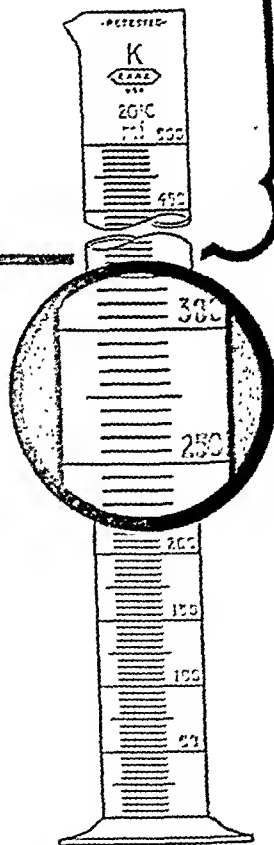


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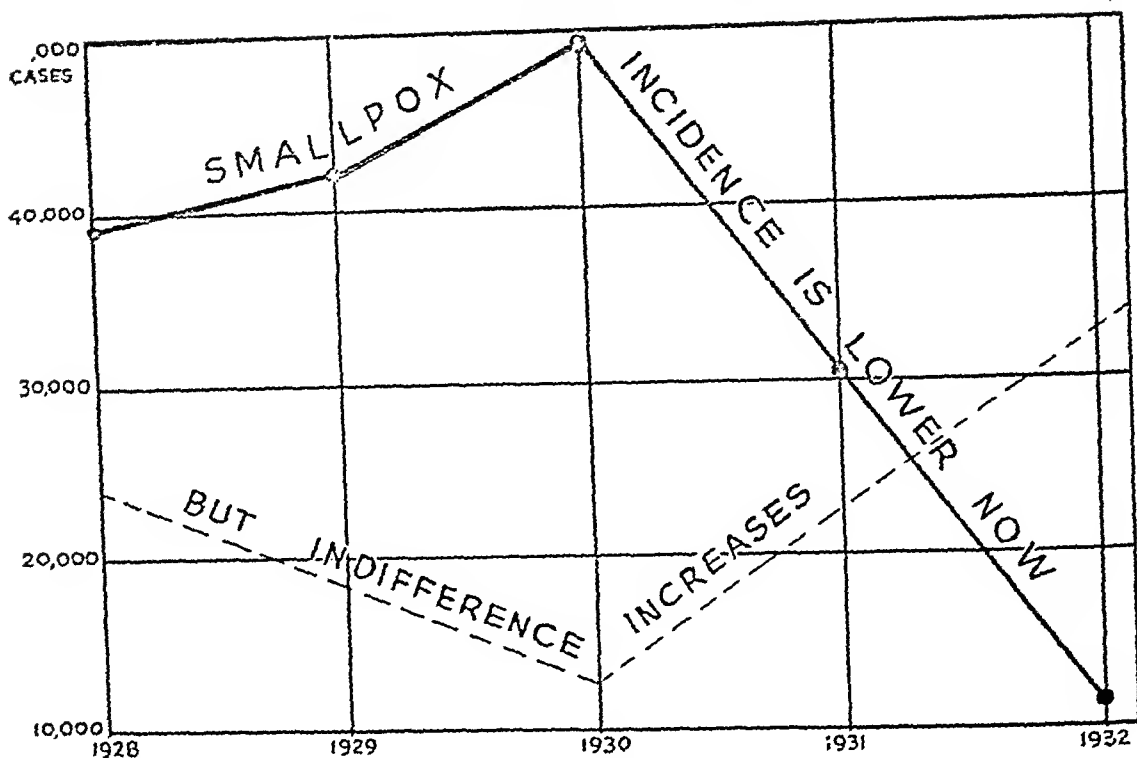
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OF smallpox, the Public Health Service* states "no other disease which is reported to the Public Health Service shows such notable reduction in incidence during the period covered" (1928-32). Low incidence often breeds indifference on the part of the public and results in a decreased number of vaccinations. This may in turn increase the possibility of a new flare up of smallpox unless the indifference is overcome.

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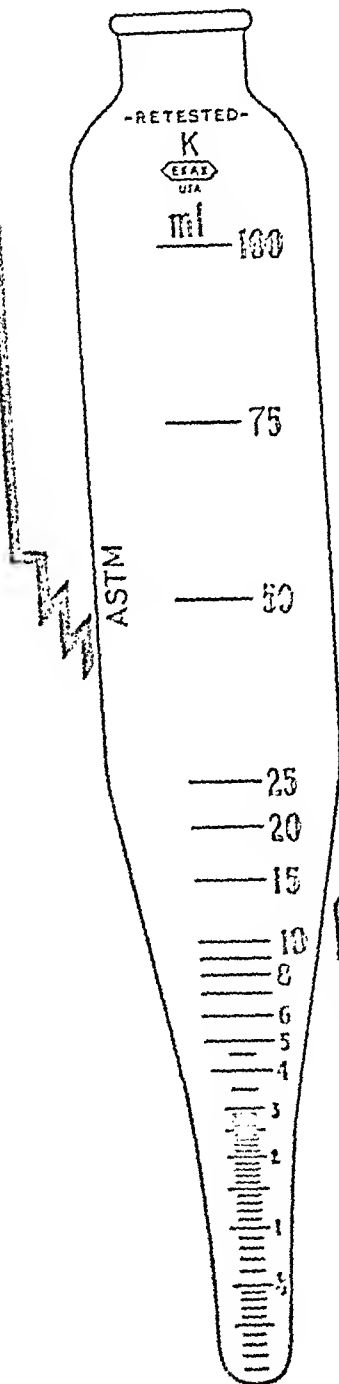
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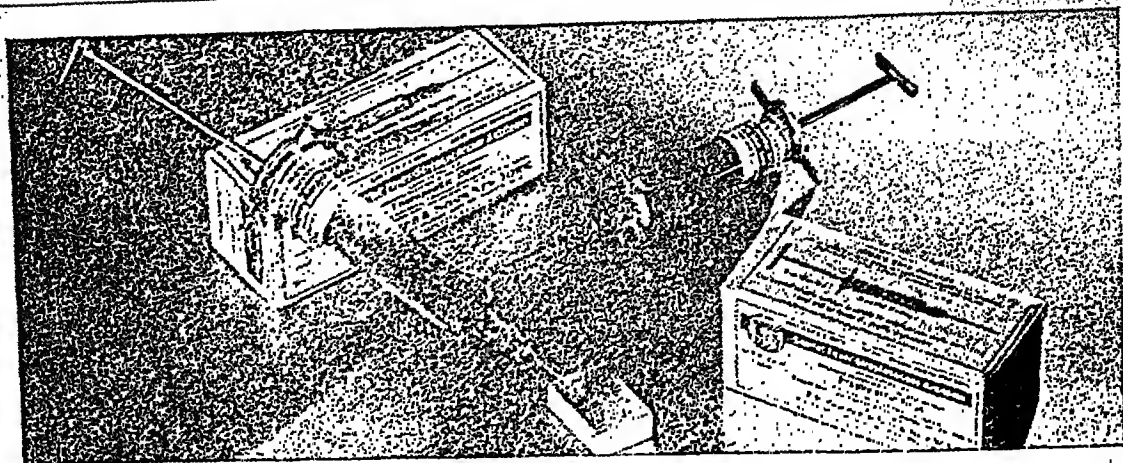
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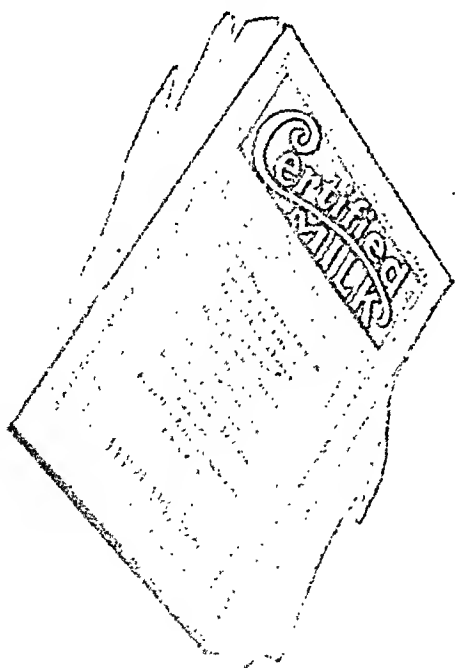
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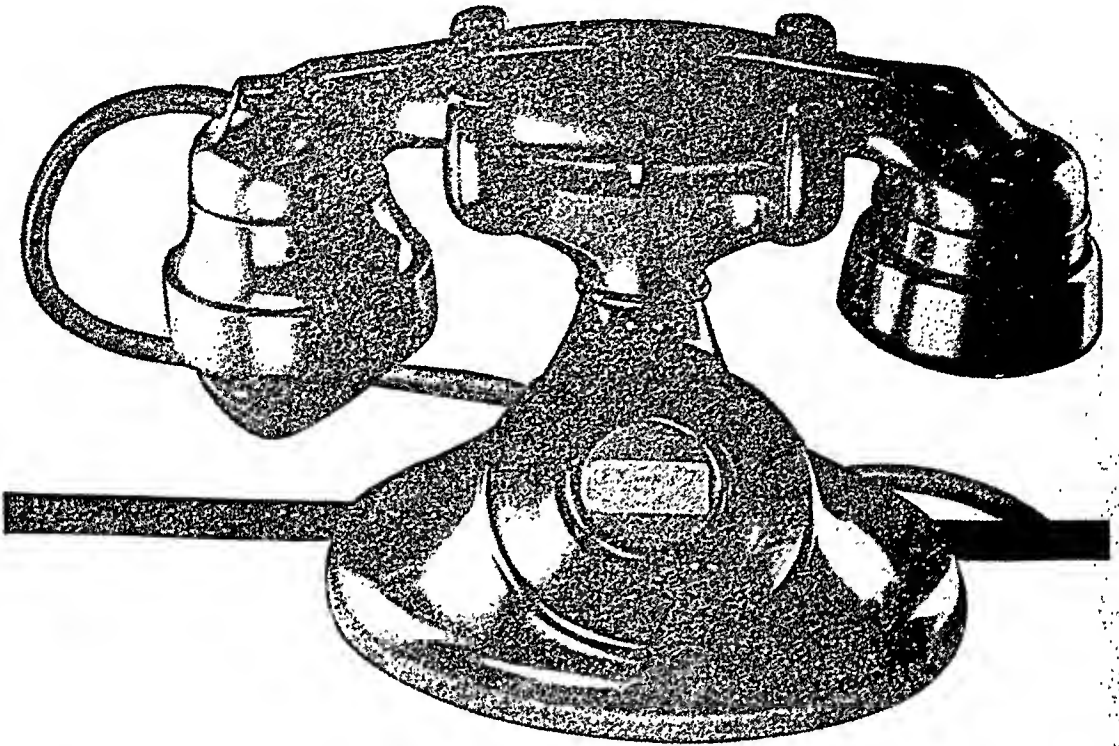
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American Journal of Public Health and THE NATION'S HEALTH

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Number 1

Permanent Value of Major Walter Reed's Work on Yellow Fever*

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I WISH to thank the officers of the American Public Health Association for the honor they have done me in inviting me to present a paper on Walter Reed's work in yellow fever. It is a particular pleasure for me to do this because as a junior medical officer in the medical corps of the army I had the privilege of knowing Walter Reed personally. To be sure, our relations were such as you would expect between a distinguished senior officer and a rather green lieutenant. I look back with pleasure to the acquaintance, and I shall always remember his friendly way of being helpful to the younger men in the medical corps of the army.

It was in October, 1900, at Indianapolis, Ind., that Walter Reed¹ presented a preliminary report before this Association, describing the work carried out up to that time by the army yellow fever board, which included in its membership, in addition to Walter Reed, James Carroll, Aristides Agramonte, and Jesse W. Lazear.

In this preliminary report Reed first disposed of the *Bacillus icteroides* of Sanarelli, by showing that neither in blood cultures from 18 patients nor at autopsies of 11 cases was this bacillus to be found. The second part of the paper deals with the mosquito, *Aedes aegypti* (known formerly and mentioned by Reed, as *Culex fasciatus*), as the intermediate host of the parasite of yellow fever.

Reed was fully aware of the hypothesis of Carlos Finlay² of Havana, but was unconvinced by his ingenious discussions. In fact, Reed states: "We believe that he has not as yet succeeded in reproducing a well-marked attack of yellow fever within the usual period of incubation of the disease, attended by albumen and jaundice, and in which all other sources of infection could be excluded."

Reed was, on the other hand, greatly influenced by the work of Surgeon Henry R. Carter,³ U. S. Public Health Service, who studied cases of yellow fever at Orwood and Taylor, two neighborhoods in rural Mississippi. Carter observed that it was quite safe for friends to visit a house for a period of 2 or 3 weeks after the development of

* Presented at the Special Memorial Session to Dr. Walter Reed and His Associates on the Yellow Fever Commission at the Sixty-second Annual Meeting of the American Public Health Association in Indianapolis, Ind., October 11, 1933.

the first case of yellow fever in the house, but very dangerous to visit the house after that time. In other words, the house did not become infected until 2 to 3 weeks after the arrival of the patient in the house. Carter called this the period of extrinsic incubation, in contrast to the incubation period of the disease of 1 to 7 days in the person contracting it.

This extrinsic incubation period suggested to Reed the probability of an insect carrier, such as has been found by Sir Ronald Ross in malaria. In the preliminary note presented at Indianapolis he reported 2 positive cases of yellow fever caused by bites of the *Aedes aegypti*, with the usual period of incubation and in which other possibilities of infection could be excluded. The paper is short, concise, and clear, and will well repay the trouble of reading it again.

It is interesting that 33 years later, as one studies Reed's paper, one finds that nothing has to be changed. Much has been added to our knowledge of yellow fever, particularly since 1927, but nothing has had to be taken away from the findings and conclusions embodied in the paper; and this demonstrates, better than anything I can say, the merit and the soundness of Walter Reed's work.

After the Indianapolis meeting Reed returned to his studies in Havana, but while he was still in the United States he made a complete schedule of the experiments to be carried out. These were so arranged that each hypothetical question would be answered by a definite yes or no. This arrangement of the investigation, breaking down the problem into a number of definite hypotheses, each of which can be answered by yes or no, is called by the Germans a "Fragestellung." An examination of Reed's Fragestellung is well worth while, since it is in all respects a model.

In his second paper, read at the Pan American Medical Congress in Havana, Cuba, in February, 1901, Reed was able to present further evidence that the mosquito carried yellow fever, and under what circumstances.

He built a small camp in an isolated place, where he could control absolutely the entire personnel and prevent infection from occurring in the usual way. In this small community of 12 non-immune persons he produced at will 2 outbreaks of yellow fever, the first of 4 cases, the second of 1; and he could limit the number of cases to the number of persons he exposed to the bites of infected *A. aegypti* mosquitoes. The proof that the *A. aegypti* was the intermediate host of the infection was clear and complete.

Following this he showed, as the second necessary step, that the disease could not be propagated in other ways. It had long been the custom of health departments to disinfect houses where yellow fever had occurred, and, of course, every article in the sick room. Quarantine officers were accustomed to disinfect ships, including the cargo and even rocks carried as ballast, and, of course, the passengers' baggage.

Reed determined to test by experimental methods the validity of the common belief that yellow fever was conveyed by fomites. He erected a small house, 14 by 20 feet, with poor ventilation and a rather dark interior but with good screening. In this he placed the soiled linen of patients who had died of yellow fever. Of all classes of fomites, bedding and clothing had always been considered the most dangerous.

In this dark, ill-ventilated room, furnished with soiled bedding and clothing, Dr. R. P. Cooke and 2 privates of the hospital corps slept every night from November 30 to December 19, 1900, a period of 20 days. The experiment was repeated with 2 other non-

immune young Americans for another period of 20 days, ending on January 10, 1901, after additional recently contaminated bedding and clothing had been added. The experiment was repeated a third time with 2 other non-immune young Americans and fresh fomites.

The total period of exposure to so-called infected fomites was 63 days. Seven non-immune persons were exposed, and none of them became infected. Reed's demonstration of the erroneousness of the time-honored doctrine of infectious fomites was immediately accepted by the world.

The third step was to repeat the mosquito work under conditions which could be controlled exactly, and for this purpose he built a second small house, called the infected mosquito building, which was divided into halves by means of a huge screen of wire mosquito netting, extending from floor to ceiling. The only difference between the two rooms was that one contained *A. aegypti* mosquitoes, which had fed on yellow fever patients in the first 3 days of their illness, and the other room did not. Into both rooms he introduced non-immune soldiers; those admitted to the mosquito room contracted yellow fever; those admitted to the mosquito-free room did not. Although the results of the first series of experiments were quite convincing, they lacked what in experimental parlance is called a control. This lack was supplied in the third series by the twin room building, where the conditions were identical on the two sides of the screen, except for the infected mosquitoes on the one side.

One other fundamental experiment was carried out at this time. Reed, Carroll, and Agramonte⁴ produced 4 cases of yellow fever by the subcutaneous injection of blood from yellow fever patients in the first and second days of their illness. This direct method of transfer showed that the infectious

agent was present in the blood, and that mosquitoes added nothing to it, but played a rôle similar to that of anopheles mosquitoes in malarial fever.

This made Reed's conclusions incontestable and convincing to the world, and they have remained true and incontestable to this day. In all the long history of medicine and of natural science there is no better example of the use of the experimental method than this work of Reed and his colleagues. They had shown that yellow fever is carried by *A. aegypti* and that it is not conveyed by fomites.

Reed at this time returned to Washington, but Carroll remained in Havana and studied the effect of filtered blood serum from yellow fever patients. He found that the infectious agent passed through a Berkefeld filter which held back bacteria, and that the infectious agent resembled in this respect the virus of hoof and mouth disease. This was one of the earliest observations on filter passing viruses, and Carroll's findings have been fully confirmed in the past few years.

A survey of the city of Havana had shown that *A. aegypti* was everywhere present in vast numbers, and Reed logically recommended the destruction of these mosquitoes and the protection of the sick against their bites. As a result, all fever hospitals both civil and military were screened, and an anti-mosquito campaign, inaugurated by General Gorgas, the chief medical officer in Cuba, was begun. The campaign was continued and extended, and within a year the disease in Cuba was brought under control, and ultimately eradicated. This closes the first chapter in the modern history of yellow fever.

Reed, having found the method of transmission of the disease, and having recommended a campaign against it based on mosquito control, was recalled to Washington to take up his work at the Army Medical School. As

we look back, we cannot but regret that he did not continue his studies, free from teaching duties. He might have advanced our knowledge and anticipated much of the work of the past decade. What Walter Reed lacked was an experimental animal; he was compelled to use human beings, which greatly limited his experiments. Had he been permitted to continue the yellow fever studies he might have found years ago the animal suited to his needs, and continued his contributions to our knowledge of the disease. As it was, no progress was made from 1901 to 1927.

The second chapter of yellow fever studies begins in 1927 with the discovery by Stokes, Bauer, and Hudson⁵ that the Asiatic monkeys, *Macacus rhesus* and *M. sinicus*, were susceptible to yellow fever and might be used as experimental animals. This finding was the result of a long painstaking search for an experimental animal. Every possible species of West African animal including the chimpanzee was tested, and none of them was found susceptible, a rather interesting and important observation. It was not until the investigators tested the common monkey of the zoological garden, *Macacus rhesus* from India, that they were successful. Now that at last an experimental animal was available it became possible to take up the work where Walter Reed had dropped it. Reed's findings were confirmed and extended.

Although yellow fever in monkeys is usually fatal, nevertheless some of the monkeys that were experimentally infected survived, and they remained immune just as human beings do. Their immunity was shown, (1) by resistance to re-infection, and (2) by the fact that their blood serum would protect another monkey against a fatal dose of the virus. This suggested the possibility of a protection test. Such a test is made as follows: Along with a fatal dose of the virus is given the serum to be tested,

whether of man or monkey. If the monkey survives, the protection test is positive and the donor of the serum must have had yellow fever at some time in the past. The protection test has become the basis for extensive epidemiological surveys, which have permitted later investigators to map out the distribution of the disease in Africa and South America.

As stated, West African monkeys are completely resistant to yellow fever infection. Some of the South American monkeys show evidence of infection but do not develop the symptoms or pathological lesions as completely as Asiatic monkeys. Sawyer and Frobisher⁶ have shown that other animals can develop immune bodies in their serum, although there is no mortality and usually no illness. This is true of the rabbit, ferret, guinea pig, and even the hen. Pettit, Stefanopoulo, and Frasey⁷ showed that immune bodies could be produced in horses, and although they were produced in quantity there was no apparent illness and, of course, no fatalities in this animal.

In 1930, Max Theiler,⁸ then at Harvard, found that a characteristic encephalitis could be produced in albino mice by injecting yellow fever virus directly into the brain, and further that the mouse could be used for the protection test by injecting the serum to be tested together with the virus directly into the brain.

The mouse brain is so small that only the most minute quantities can be injected into it, and for this reason Sawyer and Lloyd⁹ modified Theiler's procedure in an ingenious way. They produced a minimum injury to the brain by injecting into it 0.02 c.c. of a sterile starch solution or other irritant, and then put relatively large quantities of virus and the serum to be tested into the peritoneal cavity. The slight injury to the brain produces a point of least resistance in which the virus is implanted by the

blood stream, and under these conditions the virus increases and the usual encephalitis ensues if the serum is negative; if, however, the mice survive, it is evidence that the person furnishing the serum has at some time in the past had yellow fever. This is now the standard protection test.

Sawyer and Lloyd⁹ made another important observation as to yellow fever virus in albino mice; this is, that not all races of albino mice are equally susceptible, and that satisfactory work can be done only with certain selected strains of such mice, the heredity of the mouse being of great importance.

Walter Reed showed that at summer temperatures *A. aegypti* did not become infective until about 12 days after taking yellow fever blood, and that in the colder weather of the fall the period was prolonged. Bauer and Hudson, working in Lagos, Nigeria, in West Africa, found that the extrinsic incubation period might be as short as 9 days. Davis¹⁰ recently showed that the length of the period is affected by the temperature: at a constant temperature of 37° C. the period is only 4 days; at 36° C. it is 5 days; at 31° C. it is 6 days; at 23 to 25° C. it is 11 days; and at 21° C. it is 18 days. If the mosquitoes were kept at 18° C. they were still unable to transmit the disease after 30 days, but if they were then warmed up to summer temperature they became infective after only 6 days more. We now know that the extrinsic incubation period varies according to the temperature.

Does the virus multiply while in the mosquito? Davis, Frobisher, and Lloyd¹¹ have titrated the virus in the mosquito and have concluded that the virus does not multiply in the insect, but rather decreases in quantity with time, although enough remains so that the mosquito continues infectious throughout life. This is in marked contrast to malaria, in which disease, as we

know, the parasite multiplies enormously in the mosquito. Davis and Shannon¹³ showed that the virus of yellow fever dies with the mosquito and is not transferred to other adults with the ova.

Reed attempted to transmit the disease with one other mosquito, *C. pungens*, but failed. Since we have had experimental animals many other mosquitoes have been studied, and under laboratory conditions no less than 13 new vectors have been found, a result which would not have surprised Reed. He wrote that the subject needed further study. In nature, however, only 2 new vectors have been encountered. In Espirito Santo in Brazil, Soper¹² found a small epidemic of yellow fever going on in the absence of *A. aegypti*, but there were numerous *Aedes fluviatilis* and *scapularis*. *A. aegypti*, however, without doubt, remains the important vector.

PATHOLOGY OF YELLOW FEVER

Councilman,¹⁴ in 1890, studied yellow fever tissues at the request of Sternberg and described accurately the scattered acidophilic hyaline degeneration of parenchyma cells and parts of cells in necrotic areas of the liver, which we now know is characteristic of yellow fever.

Rocha Lima¹⁵ of Brazil first drew attention to the midzonal distribution of the necrosis of the parenchymatous cells of the liver lobule. The cells about the central vein and along the periphery are rarely attacked.

Klotz and Belt¹⁶ describe the changes in the liver as a non-inflammatory necrosis of the parenchyma, unaccompanied by collapse of the tissue or by interstitial hemorrhage, but with more or less cloudy swelling and fatty degeneration. If recovery occurs, there follows regeneration of the parenchyma without fibrosis. Hudson¹⁷ finds the same sequence of events in monkey livers.

Torres¹⁸ of Rio de Janeiro demonstrated the presence of intranuclear cell inclusions in the livers of monkeys. This important observation was confirmed by Cowdry and Kitchen¹⁰ and by Klotz and Belt.²⁰ While the inclusion bodies are found most easily in the livers of monkeys and the brains of mice, they nevertheless can be found in the human liver by careful search.

VACCINATION

The number of accidental laboratory infections was, considering the limited number of workers, very large. We have records of 33 cases with 6 deaths, and the danger was so great that it was imperative that some method of protection be found.

It had been noted that monkeys which received immune serum along with the virus were protected against illness and death. In May, 1931, Sawyer, Kitchen, and Lloyd,²¹ after much preliminary work on monkeys, began vaccinating the laboratory personnel with a serum-virus mixture. Up to the present time, over 100 persons have been immunized without any untoward results, and there has been no further illness among the laboratory personnel.

The present vaccine is therefore successful, but it is cumbersome and costly, and many studies are under way with the object of making it simpler. Some of these studies are quite promising. If the vaccine can be simplified it will be of great help in fighting the disease in infected regions. For example, the entire air personnel could be protected.

DISTRIBUTION OF YELLOW FEVER

The present wide distribution of yellow fever is important and is only now becoming known. So far as we are aware there is no longer any in North or Central America. In South America it is found in northern Brazil, including the Amazon valley, and on the eastern slopes of the Andes in Bolivia. There

is also a small but persistent focus in the interior of Colombia. Although the infected area in South America is extensive, it is constantly diminishing. There are, for example, no longer any foci on the Pacific coast, and it is not unreasonable to expect that if the present campaign is carried out actively for a long enough time the Americas may be freed from the disease.

In Africa, however, the situation is quite different. The area involved is very extensive and the population is huge; in Nigeria alone, there are 20 million blacks living under the most primitive conditions. In Senegal, the Belgian Congo, French Equatorial Africa, Uganda, and the southern end of the Anglo-Egyptian Soudan, are millions of primitive Africans. It will be a long time before the state of civilization and sanitation will make it possible to fight the disease effectively in this region.

A. aegypti mosquitoes can be controlled in the coast towns, however, and the transportation personnel can be vaccinated. Dr. Henry R. Carter believed that West Africa is the real home of yellow fever and that the disease was brought to the Americas by slave ships.

The endemic areas in South America and West Africa were quite harmless to Europe and America until new methods of travel were perfected. Now as new regions are opened up by automobile travel, the disease spreads, and as vast regions are brought close together by the airplane we are again in danger of having yellow fever carried to the Mediterranean and to our own shores.

It behooves us therefore to continue to pursue the study of the disease and its habits of spread, with all the energy possible; to devise better methods of protection than we have had; to develop the practice of vaccination still further; and so to carry on the great work which Walter Reed began in 1900.

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Argentina—First National Conference on Neglected and Delinquent Children

THE first national conference on neglected and delinquent children in Argentina was held in Buenos Aires from September 25 to September 30, 1933. It was organized by the National Council for the Welfare of Minors (Patronato Nacional de Menores), a government agency established in 1931 for dealing with the welfare of neglected and delinquent children. The conference was attended by nearly 100 delegates from various parts of the country. The delegates urged the establishment of one-judge juvenile courts throughout the country and the enactment of uniform child welfare legislation in the various provinces. A bill to carry out these provisions was presented at the conference. It was decided to hold such conferences every two years.—*La Prensa*, Buenos Aires, Sept. 25-Oct. 1, 1933.

X-Ray Mass-Procedure Applicable for the Discovery of Early Tuberculosis in Industrial Groups*

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New York, N. Y.*

IT has long been recognized in British, European, and American experience that tuberculosis is especially prevalent among industrial workers. Although in some instances this is due to specific occupational hazards, in most cases it is believed that there are a number of factors operating, such as the strain of employment, increasing opportunity for infection through contact, and low wages with a resultant low standard of living. Although the causes are not always clear, the fact remains, corroborated by mortality data, that there is a concentration of tuberculosis among adults in industry, especially in urban areas. This concentration is emphasized in a comparison of 10,000 industrial workers¹ with approximately 100,000 white male policy holders examined by the Life Extension Institute.² Although the gross rates for these two groups are not strictly comparable, the wide divergence in the incidence according to age (Figure I) between the employed males and a large sample of males drawn from the general population, clearly points to the importance of industrial factors in the prevalence of the disease.

Data from a recent survey in New York City³ of 20,000 individuals, most of whom would under normal condi-

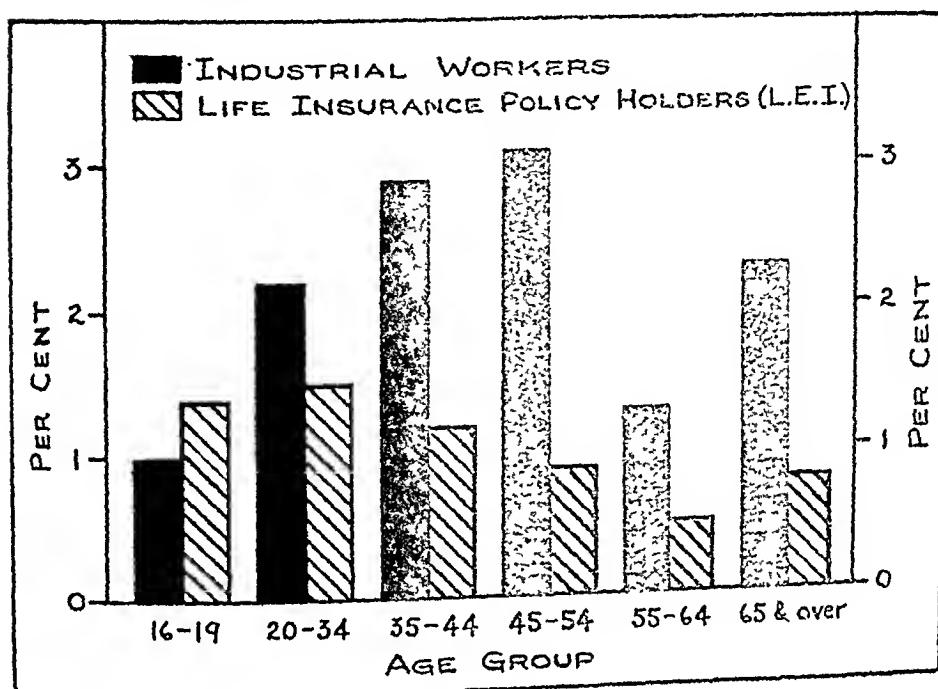
tions be found in industrial groups, further confirm the fact of a high tuberculosis morbidity among adults and especially among males. For example (Figure II), in one group of approximately 5,000 white persons surveyed, the yield of definite tuberculosis in the age groups over 20 was from 6 to 10 times as great as for the group below 20 years of age (2.7 to 4.1 compared with 0.4). In all age groups over 30 there was a definitely higher per cent among the males than among the females. The New York survey shows strikingly that the most fruitful place to search for the undiscovered cases of tuberculosis in a community is among the adult population.

How to reach the adult, especially the adult with minimal tuberculosis, and the chronic case, is a difficult problem for the community interested in tuberculosis control. The belief is now generally accepted among those working constantly with tuberculosis, that the disease may not only exist but spread for a considerable period of time before symptoms occur which would cause the individual affected to seek medical care. Therefore, adequate case finding among adults cannot depend upon the individual's presenting himself for examination or medical care, but rather should include the examination of groups of apparently healthy individuals. Industrial groups offer a logical point of

* Read before the Industrial Hygiene Section of the American Public Health Association at the Sixty-second Annual Meeting in Indianapolis, Ind., October 12, 1932.

FIGURE I

PER CENT OF PERSONS FOUND TO HAVE RESPIRATORY TUBERCULOSIS (SUSPECTED OR ACTIVE) AMONG 10,000 MALE INDUSTRIAL WORKERS AND 100,924 WHITE MALE LIFE INSURANCE POLICY HOLDERS (L. E. I.)



attack, but relatively little has been accomplished along this line because of the time and expense involved. Also industrial medical service generally is inadequate for and not adapted to preventive work in tuberculosis.

The ineffectiveness of the usual medical service provided for employee groups as a means of tuberculosis control is illustrated in the case of an industrial organization employing non-factory, semi-skilled and clerical workers. Out of 110 employees referred by this organization to the Consultation Chest Service for Private Physicians* over a period of about 4 years, 51 were found to be tuberculous (Figure III). Of these, 33 or 64.7 per cent were moderately or far advanced. Many of them were sputum positive and had undoubtedly been active sources of infection. Among the causes of the advancement of the disease before diagnosis, there must be considered certain

personnel regulations in this particular group. The men belong to a low income group with a maximum salary of \$2,100. They are allowed 10 days sick leave with pay per year, which, although it is cumulative, is negligible in the care of a chronic disease such as tuberculosis. An absence of 1 year causes them to be dropped from the organization list. No provision is made for assistance to families of sick employees, or for their referral to a suitable agency. Therefore, although the customary medical clinic is maintained for emergencies and illnesses, it is no wonder that an employee will report to it only when seriously ill. Tuberculosis with its insidious onset has every chance to gain headway, and there must be in this group many unknown cases who are actively spreading the disease.

Effective control of tuberculosis, especially in the discovery and care of minimal cases in an industrial group, is illustrated by the experience of the Metropolitan Life Insurance Company⁴

* Department of Health. New York City.

during the past 5 years. In 1927 there were two serious tuberculosis problems confronting the medical department in the Home Office. Even after careful preemployment examinations, there were each year a number of breakdowns from tuberculosis among persons employed from 6 months to a year. Also the proportion of advanced cases among the employees found to have tuberculosis had reached about 50 per cent, although all of these employees had annual medical examinations. It seemed either that there was developing in the group an unusually progressive form of tuberculosis, or that the method of examination—an annual physical examination with intercurrent care in the medical rest room for illness—was inadequate, inasmuch as certain cases escaped detection. In October, 1927, the company attempted to rule out manifest tuberculosis in new employees by including in all preemployment examinations a fluoroscopic examination followed by X-ray when indicated. Beginning in March, 1928, the same

method was added to the annual examination of all employees in an effort to detect tuberculosis, even in the absence of physical signs or symptoms.

This intensive survey resulted in the discovery of a comparatively large number of cases in 1928 (Table I). The

TABLE I

TUBERCULOSIS CASES DISCOVERED AMONG HOME OFFICE EMPLOYEES. METROPOLITAN LIFE INSURANCE COMPANY—1928 TO 1932 *

Year	Number of Home Office Employees	New Cases Discovered	
		Number	Rate per 10,000 Employees
1928	11,530	152	132
1929	11,966	96	80
1930	12,468	73	58
1931	13,081	67	51
1932	13,532	58	43

* Unpublished data furnished through the courtesy of the Medical Department of the Metropolitan Life Insurance Company.

continuation of this method has brought about a definite decrease in the tuberculosis morbidity rate, from 132 per 10,000 employees in 1928 to 43 in 1932.

FIGURE II

PER CENT OF 5,035 WHITE PERSONS IN HARLEM WITH DEFINITE TUBERCULOSIS CLASSIFIED BY AGE AND SEX, NEW YORK CITY, 1933

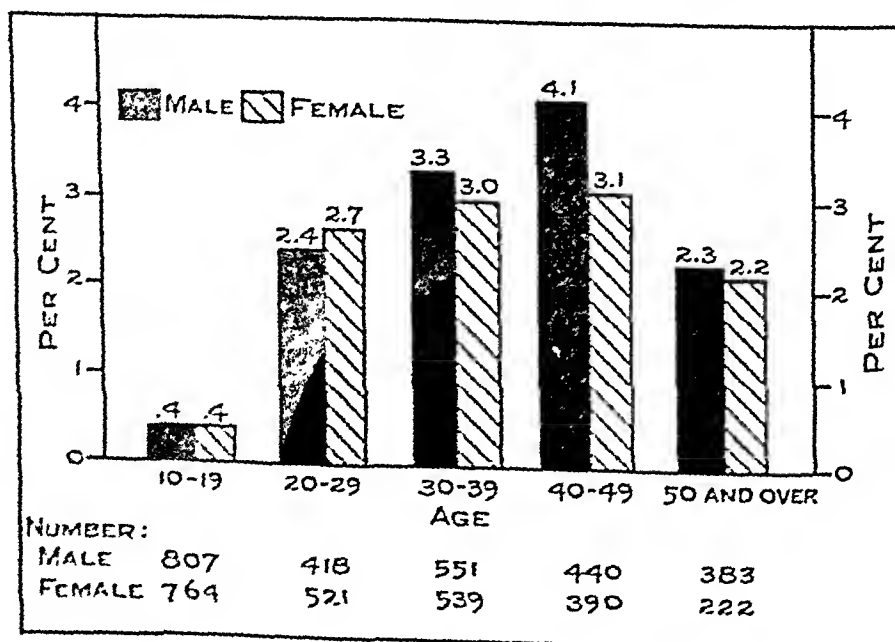
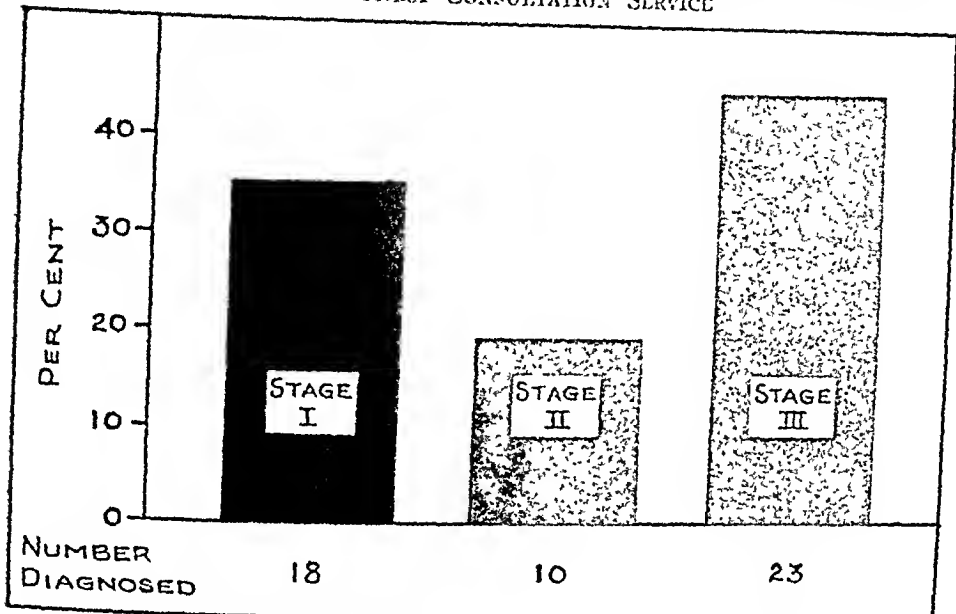


FIGURE III

DISTRIBUTION OF DIAGNOSES AMONG 110 INDUSTRIAL EMPLOYEES REFERRED TO THE CHEST CONSULTATION SERVICE



Department of Health, New York City, Jan. 1, 1930-Aug. 28, 1933.

An even more interesting result has been the shift in the proportion of active cases diagnosed in the minimal and the advanced stages, as represented by the employees unable to work who were admitted to the company sanatorium or placed under the care of their own doctors (Table II, Figure IV). By 1932 the per cent of cases in the minimal stage had increased from the 47 per cent of 1928 to 76 per cent; while the per cent of cases in the advanced stage

had dropped from 53 per cent to 24. The shift has been further emphasized by a change in the type of case admitted to the sanatorium. At present, many of the cases admitted have only X-ray findings with no symptoms or physical signs and the length of stay required in the sanatorium has been markedly decreased. The medical department believes that the tuberculosis problem in the Home Office is at present under control and that there now occurs only the development of the amount of tuberculosis which probably is normal for a group of this type.

The use of the X-ray as an effective screen for discovering tuberculosis in adults, and particularly its efficiency in detecting minimal lesions, is again strikingly illustrated by the findings in the New York City Survey (Figure V). Out of the group selected by X-ray for further study, 558 persons were finally diagnosed in the follow-up clinic as having definite tuberculosis and of these 82.3 per cent were classed as minimal while only 17.7 per cent were moderately or far advanced.

Although the X-ray is accepted as

TABLE II

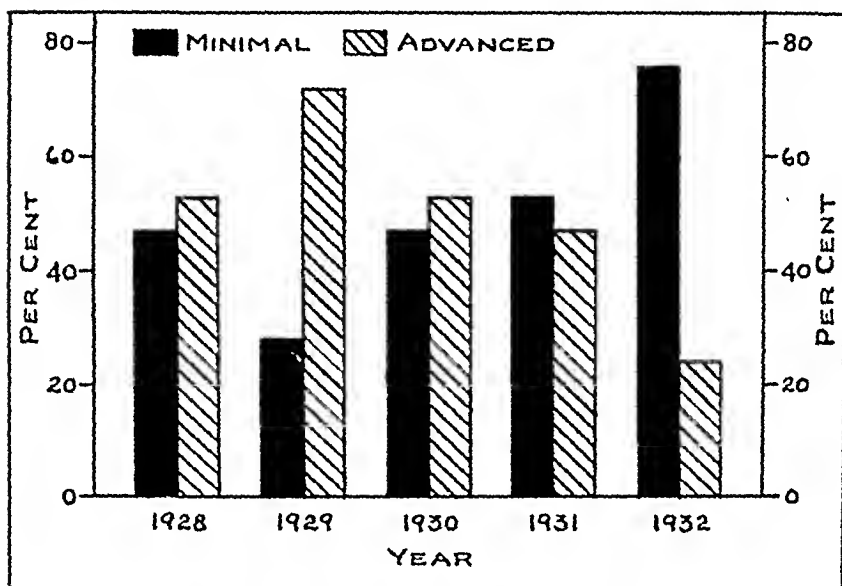
NEW TUBERCULOSIS CASES CLASSIFIED BY STAGE AMONG HOME OFFICE EMPLOYEES REFERRED FOR CARE TO SANATORIUM OR PRIVATE PHYSICIANS. METROPOLITAN LIFE INSURANCE COMPANY—1928 TO 1932 *

Year	Total Cases Referred for Care	Stage of Disease			
		Number		Per Cent	
		Min.	Adv.	Min.	Adv.
1928	53	25	28	47	53
1929	29	8	21	28	72
1930	36	17	19	47	53
1931	38	20	18	53	47
1932	37	28	9	76	24

* Unpublished data furnished through the courtesy of the Medical Department of the Metropolitan Life Insurance Company.

FIGURE IV

PER CENT OF NEW CASES OF MINIMAL AND ADVANCED TUBERCULOSIS AMONG "HOME OFFICE" EMPLOYEES REFERRED FOR CARE TO SANATORIUM OR PRIVATE PHYSICIANS, METROPOLITAN LIFE INSURANCE COMPANY, 1928-1932



Based on unpublished data, Medical Department, Metropolitan Life Insurance Company.

the most effective method now available for the diagnosis of tuberculosis in adults, its costliness has previously served as a barrier to any extensive use. In New York City in 1933 an opportunity presented itself to study the use of a new commercial method of mass X-ray procedure* by which individuals may be X-rayed at the rate of 150 an hour at the relatively low cost of \$.75 per person if 500 or more individuals are X-rayed per day. This is accomplished by the use of paper film in roll form in a special cassette box, and a series of synchronized units of procedure.†

The subjects strip to the waist and then put on cotton slips, which do not interfere with the subsequent X-ray procedure and make it possible for them

to wait in large groups without embarrassment. As they file past a typist, seated before a special electrically operated typewriter, each steps on a direct-reading dial type of weighing scale, adjacent to which is an upright standard plainly marked in inches. The typist records on a special card made of lead and cardboard, any data desired, such as name, address, age, sex and name of private physician or organization. This card is handed to the subject who, in turn, hands it to the X-ray operator. These cards can be easily typed at the rate of 3 per minute. The subjects then stand in line waiting to be X-rayed.

The machinery is carefully shielded so that no harm can come to those in line. Two technicians are employed, one to place the subject in position, the other to make the exposure. The radiographic unit consists of a standard X-ray generating equipment and tube, and a new form of magazine cassette designed for very rapid operation.

* Powers X-ray Products, Inc., 205 West 39th Street, New York.

† For illustration of methods of procedure, see Barnard, Margaret Witter, M.D. Paper Films in Chest Radiography, *Med. J. & Rec.*, cxxxvii, 6:251-253 (March 15), 1933.

The cassette holds a roll of paper film 14 inches wide and 150 feet long, sufficient to make 100 radiographs 14 x 17 inches each. Provision is made for changing rolls or reloading in daylight. The cassette contains a suitable mechanism for measuring and feeding successive portions of the paper film into position for exposure, and for placing the intensifying screen in close contact with the sensitized side of the film. But one intensifying screen is used, located on the opposite side of the film from the tube. The cassette is quickly and easily adjustable in height to suit the subject being X-rayed. A quickly adjustable compression band permits the holding of the subject closely against the face of the cassette. This compression band can be moved instantly to bring it to the proper height on the subject. Actuated by the compression band mechanism is a pointer which registers on a dial the thickness of the chest of the subject and indicates to the second operator the proper amount of radiographic energy to use for that exposure. The tube support is linked up with the cassette and the compression band in such a manner that the tube is kept automatically at the height of the middle of the compression band. No time therefore is wasted in adjusting the position of the tube, which is always centered on the vertical median line of the cassette.

For the sake of speed in operation, 3 of the 4 controllable variables, viz: time, distance, amperage, and voltage, have been standardized. The time is usually $3/20$ second (occasionally $4/20$ for very thick chests). The distance from the tube to film is 40 inches. The amperage is 100 milliamperes. The voltage is then changed to suit the chest of the subject and varies from 60 to 80 kilovolts.

By means of this coördinated mechanism, designed to simplify the

necessary operation of changing films and positioning the subject and tube, it is possible for two technicians to X-ray subjects at the rate of 4 per minute. A convenient rate of 150 per hour can be maintained without any difficulty, over a long period of time. This speed of taking X-rays would, however, not be of much value unless the procedures of developing and interpreting could also be carried out with equal speed.

The finished rolls are taken immediately to the plant and developed in the roll form, fixed, washed, dried and rolled on a spool ready for interpretation, and returned to the owners. For interpretation, the roll is placed on a special viewing cabinet, in which the films are properly illuminated through daylight glass. The films are successively turned for viewing, either by hand or by an electric motor. The identification data are imprinted on the films from the typed lead marker, saving considerable stenographic time and bookkeeping. Normal films may be simply checked and passed. Any abnormalities noted may be marked directly on the film. The company furnishes all necessary equipment and personnel and delivers the developed film in roll form to the organization at a set price per capita. The films are practically fireproof and may be filed without hazard, either in the roll or cut into separate sheets. Considerable work has been carried on to establish the technical reliability of the paper films⁵ and it is at present our opinion that they are entirely adequate as a diagnostic screen.

Using this method, an X-ray survey was made in 1933 under the direction of Dr. Shirley W. Wynne, Commissioner of Health of New York City, of approximately 20,000 individuals from families on Home Relief,³ in those areas where, because of the excessively high tuberculosis mortality rates, it was be-

lieved there must be many undiscovered foci of infection. The survey was carried out as one of the work projects for medical and nursing service, under an appropriation by the State Temporary Emergency Relief Administration. The two areas selected were Harlem, where the negro and Porto Rican groups predominate; and Red-Hook—Gowanus and Williamsburg—Greenpoint, in Brooklyn. In these areas the tuberculosis death rates were from 4 to 6 times that for the city as a whole, and the same general conditions prevailed of low economic status, with poor and crowded housing facilities.

The Harlem area was surveyed first, all members, 10 years of age and over, of families on relief lists being asked to report for the examination. Approximately 10,000 individuals were X-rayed in about 6 weeks' time. The developed films were delivered to the Bellevue-Yorkville Health Demonstration, where they were interpreted, cut, and distributed to the follow-up clinics. The reading of the films was completed in about 8 weeks. Cases diagnosed on X-ray as tuberculosis or suspect-tuberculosis were cleared with the city registry, and those not previously known were examined in the follow-up clinics and placed under care. All household contacts, other than those already found negative in the X-ray survey, were asked to report for examination. These contacts were mainly children under 10 years of age, who were tubercu-

lin tested and X-rayed if positive to tuberculin. When this follow-up had been fairly well cleared, the cases were turned over to the official clinics of the district. The second survey of approximately 10,000 individuals was then carried out in a similar manner in Brooklyn.

Besides the cases diagnosed by X-ray as tuberculosis and suspect-tuberculosis, there were discovered a large number of persons with cardiac lesions, and these were also listed for investigation. Table III shows the number and per cent of persons designated by X-ray findings for follow-up work in each area.

Twelve hundred and fifty-four or 12.3 per cent of the 10,232 persons X-rayed in Harlem, and 976 or 9.8 per cent of the 10,000 persons X-rayed in Brooklyn, were diagnosed as having tuberculosis (definite, suspect or healed). In addition, there were 548 persons (5.4 per cent) in the Harlem group, and 204 persons (2.0 per cent) in the Brooklyn group, found to have cardiac lesions. The higher rate of cardiac conditions among the Harlem population X-rayed is due to the very high rate (8.2 per cent) found among the colored.

The marked difference in the two areas in the per cent of persons classified as having suspect tuberculosis (4.9 per cent in Harlem as against 0.9 per cent in Brooklyn) is largely due to a change in the age groups selected for survey. Based in the Harlem experience, it was considered better adminis-

TABLE III
X-RAY SURVEY OF 20,232 INDIVIDUALS (10,232 IN HARLEM AND 10,000 IN BROOKLYN)
IN NEW YORK CITY—1933

X-ray Diagnosis of Cases	Number			Per Cent		
	Harlem	Brooklyn	Total	Harlem	Brooklyn	Total
Total Tuberculosis	1,254	976	2,230	12.3	9.8	11.1
Definite	221	331	552	2.2	3.3	2.7
Suspect	506	92	598	4.9	0.9	3.0
Healed	527	553	1,080	5.2	5.5	5.4
Cardiac	548	204	752	5.4	2.0	3.8

tratively to concentrate the survey on those age groups in which there was the greatest yield of definite tuberculosis (Figure II). Therefore in the Brooklyn part of the survey only persons 15 years of age and over were included.

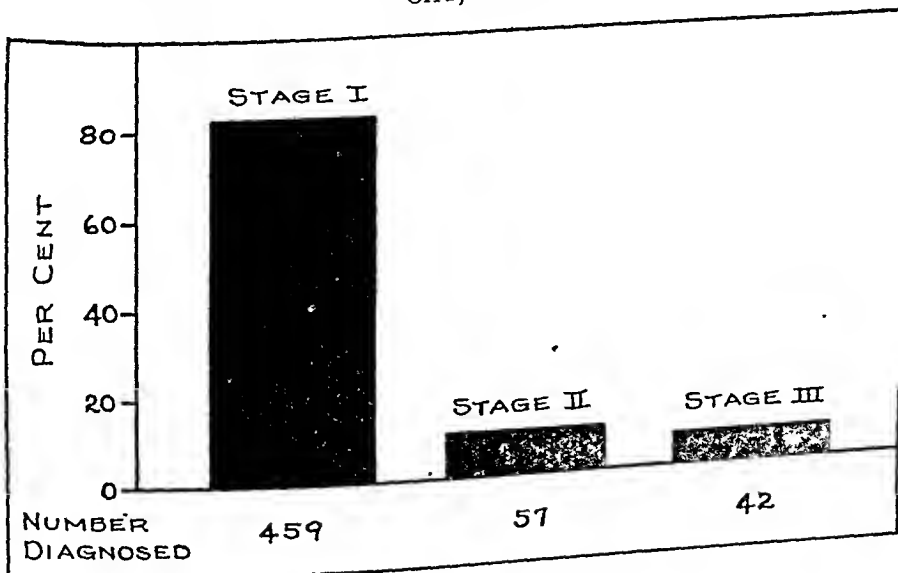
The astonishingly high percentage of minimal cases among the group finally diagnosed as tuberculosis (Figure V) suggests that we have by this survey probably screened out, while still in minimal form, the moderately and far advanced cases, of 1934 and 1935. Very few of these cases were previously known or were receiving medical care. Most of the individuals did not have symptoms which would have caused them to seek medical aid or to stop work; yet, out of 332 cases finally diagnosed tuberculous in the Brooklyn follow-up clinic, only 14 (4 per cent) needed no further care and 140 (42 per cent), 105 of whom were minimal cases, were recommended for institutional care.

An unexpected by-product of the survey which has aroused considerable interest, because of its public health im-

plications, was the diagnosing of a large number of cardiac lesions by X-ray. Of the entire group of 20,232 persons, 752 were considered from the X-rays to have cardiac pathology. Of these 548 were in the Harlem area and included a large number of persons with aneurysms and other probable luetic cardiac lesions among the negroes. This entire group was referred to the Harlem Health Center for Wassermann tests and, if necessary, to the Cardiac Clinic of Harlem Hospital. The 204 persons in the Brooklyn group who were thought to have cardiac disease were asked to attend the follow-up clinic of the project, and more information is therefore available concerning them. Of this group 157 reported for further examination; 37 were found to be non-cardiac, 7 were in need of immediate hospital care, and 113 needed cardiac clinic care. Only 8 were already under medical supervision, leaving 112 newly discovered cardiac cases for whom care should be arranged. Only 28 were considered to be luetic because of history of infection or a positive blood test.

FIGURE V

558 TUBERCULOSIS CASES CLASSIFIED BY STAGE, X-RAY SURVEY, NEW YORK CITY, 1933



The X-ray survey in New York City demonstrates two prerequisites for preventive work in tuberculosis: where to look for the cases of tuberculosis and a practical and inexpensive technic for use in diagnosis. The results afford convincing evidence of the importance of tuberculosis case-finding among the adult population, and it naturally follows that a significant part of the adult population, especially in urban centers, can best be reached through industrial groups. The X-ray has proved especially effective in the discovery of minimal tuberculosis and the new technic of the rapid X-ray makes it possible to carry the examining procedure to the groups in industrial plants with a consequent minimum expenditure of time on the part of the employees.

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The authors state that the 100,924 white males used in this study do not afford a detailed picture of a random sample of the adult white native born population because of the defect of including a disproportionately small number of individuals of the lower economic and social grades; consequently the impairment rates are minimized rather than exaggerated. However, with this fact in mind, the data may be used as the best sample of the white male population for whom tuberculosis morbidity rates are available.
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Italian Industrial Welfare Work

INDUSTRIAL welfare work, which is done in Italy by women graduates of the school of social service in Rome, is at present functioning in factories, employing more than 200,000 workers. The welfare work is concerned not only with the workers but also with their families, and in this way it applied in 1932 to about 1,000,000 persons. In that year through the efforts of the

welfare workers 13,000 persons were given physical examinations in their homes or in clinics, 3,500 persons were placed in hospitals or similar institutions, and 3,000 children were sent to the seashore or mountains; advice on family problems was also given in a larger number of cases.—*Assicurazioni Sociali, Rome*, vol. 9, No. 4 (Aug.), 1933.

How Can Public Health Nursing Fit Into a Budget?*

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WE are here concerned with budgets amounting to 28 million dollars.

This is the amount of money estimated by the National Organization for Public Health Nursing as spent for public health nursing by local agencies, both official and nonofficial, in the United States in 1932. Approximately 15 million dollars were expended by official agencies, and 13 million by non-official agencies. It is further estimated that some 14,300 nurses, exclusive of those in industrial plants, were employed with this amount of money. This estimate is obtained by taking a 5 per cent reduction of the number of nurses in the 1931 census.

Lest these figures swell our heads, we should realize that if nurse distribution were even for the whole country, which alas is not the case, we would have only 1 public health nurse to about 9,000 population. On the basis of the above figures, the per capita cost for public health nursing service is about \$.23, as compared with the minimums suggested by Hiscock in *Community Health Organization* of from \$.79 to \$.86—a long way from this goal.

We deduce also that it costs on an average for all types of agencies \$2,000 to put a public health nurse in the field for 1 year, and we may expect 2,000

hours a year of service from each nurse. This brings us to the realization that each hour of the nurse's time costs the community about \$1.

These figures give us a background for the subject of this paper. For years we have tried to teach the public that health work is essential and that funds must be made available for its support. With varying degrees of success we have roused public interest, but at no time has the support of health work even approached adequacy, and naturally this has a direct bearing on the effectiveness of the service. As we discuss budgets, we must acknowledge our continuous obligation to make our work known and to develop every reasonable resource for increasing budgets. Publicity and money raising are subjects too large to be discussed here, but the need for them deserves emphasis before we come to the present situation revealed by the question "How Can Public Health Nursing Fit into a Budget?"

Today we must arbitrarily limit our subject to a consideration of how to fit our service into a budget that is not only fixed, but below the minimum that we know is essential to good community service. This is the situation of many agencies throughout the country for we know that since the depression some have had budgets reduced anywhere from 10 to 50 per cent; some have had to reduce the number of staff from 5 to 10 per cent; and salaries, the largest

* Read before the Public Health Nursing Section of the American Public Health Association at the Sixty-second Annual Meeting in Indianapolis, Ind., October 10, 1933.

item in the budgets, have been reduced an average of 10 per cent with some slashes much heavier. At the same time there has been an unparalleled demand for service, particularly for free home visiting and the free use of clinics.

Let us assume, for purposes of this discussion, that many agencies have gone as far as possible in reducing staffs and salaries, in economies of administration, in using volunteers, and in encouraging the public to support the work. In fact, it is to be hoped that this coming year may see some recovery in size of staffs and salaries. However, the big question today for many agencies still is: "Shall we stretch and thin our service in order to answer every demand made upon us?" or "Shall we make a selection of the types of program to be maintained and a correspondingly careful selection of the types of cases to be carried?"

Whether we consider these questions from the standpoint of the official agency or the nonofficial, we know that our results depend primarily on the ability of our nurses. We are dependent on each individual nurse to make that 1 hour of service worth the \$1 which it costs the community. Recognizing the staff nurse as the pivot around which results center, how can we fail to provide in our budgets those essentials which increase her ability—proper working conditions, salaries above a subsistence level, necessary supervision, and a continuous staff educational program that help her reach her maximum productivity? Obviously here is one of the first requisites of a budget.

As budgets are prepared this fall, many agencies are facing the dilemma of going on with the stretching and thinning process, or of undertaking the selective process. Which shall it be? Believing that many agencies have now stretched and thinned to the point of jeopardizing the very results they try to obtain, let us confine our attention

to this difficult and somewhat bewildering problem of selection. Is it too bold to make the assertion that no agency activity which is unproductive of results justifies a budget? Results are concerned with quantity and quality together with those intangibles we feel through "the human touch."

We must ask then, does an agency doing public health nursing have a right to limit its service? Immediately we recognize that the official agency, supported as it is by taxes, is in a slightly different position from the private agency which earns part of its money and receives the rest from contributions. The official agency has a more difficult task in selection. It must serve the mass of the public and reach large groups of people, because supported by taxes. The private agency is more free to concentrate on service to individuals and families. With these distinctions in mind, let us raise the question in another way, "Is it possible for an agency to say 'No' to a request for service?" An outright "No" may not be tolerated by the public, especially if the "No" comes from the tax supported agency. But there are subtle ways of saying the same "No" and these ways are by the process of selection of both program and cases, and the direction of the nurse's energies where they are most needed. Private hospitals, when their beds are full, turn patients away, refer them somewhere else, or keep the less urgent cases waiting, and the public understands. In the social work field the word "intake" has assumed new significance and "intake" committees and "intake" workers are used to scrutinize each request for service. Many family welfare associations are limiting their cases to those having some deeper social problem than that of relief because relief is becoming more and more accepted as the responsibility of the public agency. We have much to learn from allied fields as

to the necessity for selection and the methods to use in its accomplishment.

We come now to the question "How can selection be made?" No one person, nor the experience of one agency can fully answer it. Each agency must chart its own course by a searching analysis of its records and statistics in relation to the service it offers. There never was a time when exact measurements based on records was so important. Do you know that the results you *think* you obtain are actually substantiated by *facts*? There is new emphasis on the old plea that agencies keep careful records and having kept them, use them constantly for local studies.

One method of selection, perhaps not generally recognized as such, has been the educative trend of agencies to share responsibility for health work with the families served. There has been more effort to motivate families to take care of their own problems; there has been more teaching of nursing skills to members of the family; and more explanation of community facilities which the family may use for itself. In other words, the family today is encouraged to make health decisions for itself, using the health worker as consultant.

A different type of selection, and one which is described here in the hope that it will be discussed, is an adjustment used by the Detroit Visiting Nurse Association.

Faced by the necessity of curtailing service to fit a 40 per cent cut in appropriation from the Community Fund, as of March 1, 1933, the Association decided that a more definite method of reduction must be planned, as to meet the previous 15 per cent cut of January 1, the Association had already trimmed its program. The revised budget showed that approximately two-thirds of the income was from self-support, and one-third from the Community Fund. A weekly analysis from the nurses' daily reports was instituted to see how closely the work followed this distribution of funds. The analysis for February

showed that 50 per cent of the visits were free, 12 per cent part-pay, and 38 per cent full-pay. The staff was told that all sick patients were to receive as much care as they needed, regardless of the fee; that aside from this exception, visits must be reduced among the non-paying patients who were not critically ill and whose family could assume the care. Very careful instructions were given to the staff in order to be certain that this plan was properly interpreted. By March the free and part-pay work represented 58 per cent; it dropped to 50 per cent in April, May, and June, and in July it increased to 57 per cent because in that month the Community Fund increased its appropriation for free and part-pay service.

The weekly visit and fee analysis has proved a useful device in regulating the work to a fluctuating budget. The nurses and supervisors all agree that they have learned the technic of keeping the visit load within the capacity of the available staff.¹

It should be pointed out that it was possible in Detroit to curtail health supervision because of the excellent work done over a period of years by the Department of Health.

Perhaps the best we can do in planning how to make a selection is to try to balance 5 factors which, for purposes of this discussion, we may call "Guides to Selective Service in Public Health Nursing." There is no significance to the order, and all 5 rather than any one will play a part in planning.

1. Concentrate on those services which bring proven results.

The experience of the New York City Health Department in diphtheria control illustrates this point. In 1928 there were in round numbers 11,500 new cases of diphtheria, to which 74,000 visits were made. After the intensive diphtheria control campaign of the Health Department, the 1932 figures were 3,600 new cases to which 27,000 visits were made.² This showed a decrease of 68 per cent in cases and of 63 per cent in visits in a 4-year period. Such figures show definite results of service especially in the lower age groups, and indicate that a job well done in one field may

release nurses for activities in some other part of the program.

2. Meet the most pressing and urgent needs of the community.

How many agencies are analyzing their services according to the most generally accepted quantitative guides so far developed—the *Appraisal Form* of the American Public Health Association and *Community Health Organization* by Professor Hiscock? Are these guides on the desk of every administrator of a public health nursing service?

Do you know the highest death rates and highest sickness rates in your community? What assurance have you that your nursing service is doing its share to lower them? Perhaps some disease or condition formerly needing special attention has been so well controlled that the service given to it can be transferred where the need is greater. This possibility exists unrecognized in many communities and deserves real consideration.

3. Continue those most necessary activities for which the nursing staff is best prepared, and include those new activities for which it is possible to prepare the nurses.

It might be unwise, for example, to attempt an orthopedic service with nurses who had had no special knowledge of this field and for whom no training in this subject was available. Again, results in public health nursing are dependent on the knowledge and skill of the nurses.

4. Develop the services the public has been educated to want and to pay for.

If a community is wide awake to the value of communicable disease control and has never appreciated prenatal care, better results may be expected from continuing the former than from inaugurating the latter during "hard times." The public is expressing itself with a loud voice as to the expenditure of its money. We have spent years teaching the public to want certain

services. Concurrently with fulfilling our obligation to give the public what we have taught it to want, the teaching job must go on. We must interpret new needs and encourage support for the changing values in health work.

5. Know all of the public health, hospital and social service facilities in the community and fit public health nursing into the total community picture.

In Chicago, the Infant Welfare Society was forced to close one of its clinics located in a settlement house in a colored neighborhood.³ The Health Department decided to provide the personnel and management; the Infant Welfare Society gave the equipment; and the settlement house continued the donation of space—a nice piece of interplay between agencies, made possible through knowledge of community facilities and the ability to fit programs together.

These 5 guides, as you can readily see, leave agencies no choice in the keeping of accurate, complete records and in making studies of service. Armed with them, let us put ourselves in the position of those who are conscientiously reviewing those major community health services in which public health nursing plays an important part. How can selection be applied to these services and to the distribution of the nurse's time within each service? Where shall we place our emphasis? and do you agree that the following list is given in the order of importance with essentials first?

1. Communicable disease control including tuberculosis and venereal diseases.

The emphasis is on immunization, case-finding and the teaching of home care and hygiene.

2. Morbidity service, including care of the sick and the correction of defects.

The need of the families of the un-

employed for such service has given fresh recognition to its value. The keynote is careful instruction of the families to give the care, and to use facilities for correction of defects, with the nurse acting in a supervisory capacity until her withdrawal from the case is warranted.

3. Maternity service, including antepartum, delivery and postpartum care.

Here again more teaching of family health is encouraged. Both medical and nursing contacts with prenatal patients are important but their frequency is adjusted to the individual need of the patient and her own ability to understand her problems and to report her own symptoms. In postpartum care, visits the first 3 days are of the greatest significance to the life and well-being of both mother and child, following which normal cases can often be given their actual care by a member of the family whom the nurse may supervise. Home delivery service must be regulated according to the hospital, clinic, and medical facilities of the community, and the cost of that service to the nursing agency.

4. Health supervision.

It is important to reach the early age groups first because studies show that such conditions as malnutrition, tuberculosis, venereal diseases, and others can best be prevented in young children. Thus the order is infant first, then pre-school, school and adult. Here there is very definite opportunity for selection according to the ability of the family to meet its own problem. In some instances group teaching can supplement individual instruction; there can be a better interplay between home and clinic visits with less spacing on a purely routine basis; the appointment system can be used in clinics and is being tried out in home visits; teachers can assist increasingly with the health problem of school children.

Weaving throughout this category—and what category can ever tell the whole story—are two services accentuated by the economic and social problems of the day—nutrition and mental hygiene. These are not listed separately because they are an integral part of every contact the nurse makes with her families.

No agency in the country, official or nonofficial, will find it easy to be selective. The cut is apt to be selective within each service rather than the total elimination of any one service. Certainly it is no credit to us that we have not made these essential services appear vital in our supporting public—Why? Because, for one thing, our house has not been in order. We have cluttered up public health nursing locally with too many agencies. What practical justification is there for any community to have more than 2 agencies employing public health nurses? One would be the official agency, serving both health department and schools; the other, a private agency, would offer bedside care as part of a family health service and experiment in those fields not covered by the official service.

How can Public Health Nursing Fit into a Budget? Our answer is through careful *selection* of services on the basis of study of local needs and local results. To this end there must be close coördination of all agencies and real effort toward combining agencies where possible.

It is through learning to make public health nursing fit the budget we now have that we will see how to plan wisely for the future expansion of budgets which we trust are on their way in these days of national recovery.

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Precipitated Toxoid as an Immunizing Agent Against Diphtheria*

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THE improvement of toxin or toxoid as an immunizing agent against diphtheria has been the aim of a considerable group of workers in recent years. Ramon,¹ in 1925, found that the addition of tapioca to toxoid improved its value as an antigen and concluded that this improvement was likely the result of slower absorption and slower elimination of the antigen. In 1926, Glenny, Pope, Waddington, and Wallace,² found that the addition of alum to diphtheria toxoid greatly increased its antigenic value. In 1931, Glenny and Barr³ described the complete precipitation of diphtheria toxoid with alum and pointed out that the alum toxoid was slowly absorbed and remained in the body for a sufficient length of time to act as its own secondary stimulus.

In 1930, Havens and Wells, in Alabama, began laboratory experiments in an effort so to perfect an alum precipitated toxoid that one injection would produce immunity. Their findings have been published in previous papers.^{4, 5} Graham,⁶ in 1931, used their product on a group of children in Lee County, Ala., with encouraging results. Graham, Murphree, and Gill,⁶ in 1933, reported further clinical experience with about 96 per cent immunity resulting from a single injection. McGinnis and Steb-

bins,⁷ of Virginia, obtained approximately 95 per cent immunity in a group of 579 Schick-positive children using the Havens' precipitated toxoid, while Massey,⁸ of Maryland, in a group of 93 colored children obtained 98.8 per cent immunity following one injection of this same product. The Director of the National Institute of Health,⁹ following investigation, in a personal communication stated:

We believe that precipitated toxoid is much more active than crude toxoid and that a single dose of 1.0 c.c. is an effective agent. Reactions following its use have certainly been no more noticeable than following crude toxoid; in fact the impression is pretty general that reactions from precipitated toxoid are less frequent and less severe than following the older product. Local induration following precipitated toxoid was observed in a number of cases, particularly following the 1.0 c.c. dose. This induration was in no case objectionable and tended to clear up in about 6 weeks. It is very probable that this local reaction is associated with the large immunity response. We see no reason why Alabama should not adopt this product for general use, and can readily appreciate the great saving in time and expense which will follow.

Supported by these findings the Alabama State Committee of Public Health officially approved this product and adopted it as the standard preparation for use in the state.

This presentation is largely based on additional clinical observations, not used in prior publications, following its use by various county health officers in Alabama, which would seem to sub-

* Read before the Epidemiology Section of the American Public Health Association at the Sixty-second Annual Meeting in Indianapolis, Ind., October 11, 1933.

TABLE I
IMMUNITY STATUS FOLLOWING A SINGLE INJECTION OF PRECIPITATED TOXOID

	Group A Original Schick Positive			Group B No Prior Schick Test		
	Neg.	Pos.	Per Cent	Neg.	Pos.	Per Cent
Under 1	4	0	100	372	0	100
1-6	70	0	100	541	4	99.27
7-12	101	0	100	484	10	97.97
13 Plus	22	0	100	3	0	100
Total	197	0	100	1,400	14	99.01

stantiate further the claim that a more extensive use of the one-dose toxoid for immunization purposes is a scientific and justifiable procedure. Pennsylvania, Maryland, and Arizona State Health Departments, and the City of Pittsburgh, have officially adopted the one-dose toxoid as standard, while other states are experimenting with its use. Several of the leading biological manufacturers now have commercial preparations of alum-precipitated toxoid available.

IMMUNITY

Table I shows the immunity status of a group of children who have been given a Schick test following the toxoid. These Schick tests were done from 6 weeks to 6 months after the inoculation with an average elapsed time of 2-3 months. From this table it is evident that immunity develops quite rapidly and that the younger age groups respond particularly well. These results further corroborate previous reports.

REACTIONS

Table II shows by age groups the total number of children who have been inoculated and whose reactions have been observed. All these children were

given 1 c.c. of the precipitated toxoid subcutaneously. Many of these were given in rural areas under the conditions present in the average field clinic. Boiling of syringes and needles was the usual method of sterilization, but in many instances alcohol was relied upon between irregular boilings.

Precipitated toxoid probably owes much of its efficiency to the fact that it is slowly absorbed from the subcutaneous tissues, and consequently one might expect localized induration lasting 2-4 weeks. In 8 reported cases this indurated area finally suppurated and formed a localized abscess. None of these proved serious, but did require incision. One of these children was suffering from boils at the time of inoculation. The general run of reports from the various health officers would not indicate that the local or general reaction was any more severe than when ordinary toxoid was used. Under "Comments" from field workers the following were typical reports:

"No severe reactions." (1,100 inoculations)

"About a dozen showed localized areas of inflammation, but no suppuration occurred. Seen in larger children rather than infants." (250 inoculations)

TABLE II
TOTAL NUMBER OF CHILDREN INOCULATED

Age Number	Under 1	1-6	7-12	13 Plus	Total
	2,556	10,895	2,691	147	16,289

"No complaints of even mild reactions." (900 inoculations)

"Induration lasting 1-3 weeks. Less general reactions." (1,500 inoculations)

"One rather severe reaction. High temperature—lasted about 4 days." (150 inoculations)

"None." (200 inoculations)

"Average reaction not severe." (1,700 inoculations)

"Reactions in 16 cases; 7 slight redness; 6 redness, swelling and discomfort; 1 no reaction; 2 red swollen area 3 x 2 inches."

"One severe general reaction with chill, temperature 104°. Convulsions beginning about 4 hours after inoculation. Recovery complete." (200 inoculations)

SUMMARY

A single injection of 1 c.c. of precipitated toxoid has rendered 100 per cent of 197 Schick-positive children Schick-negative. Similarly, 1,400 of 1,414

children, or 99 per cent, were Schick-negative when tested on an average of 2-3 months after a single injection. The original immunity status was unknown. Observations on 16,289 inoculations revealed 8 with abscess formation. As a rule local or general reactions were not severe.

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Mother's Day in Italy

ANNUAL celebrations of Mother's Day on December 24 were recently ordered by the Government of Italy. These celebrations are to be held under the auspices of the local branches of the National Bureau for the Welfare of Mothers and Children. On that day marriage and birth premiums and premiums to large families will be distributed, and prize competitions will

be held for the best children between the ages of 6 months and 3 years; in addition motion-picture performances will be given for the double purpose of emphasizing the importance of large families and of providing recreation for mothers and children.—*Bollettino degli Atti Ufficiali dell' Opera Nazionale per la Protezione della Maternità e dell' Infanzia*, Rome, Oct., 1933.

Recent Advances in the Chemical Treatment of Sewage*

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PROGRESS in the treatment of sewage has been marked by the recurrence of cycles in which emphasis is placed either on the biological or the chemical phases. These cycles reflect the human trait of dissatisfaction with things that are, and the desire for new and, possibly, better things. New and different things are not always better and usually they are not cheaper; but the spirit of change and revolt from established usage usually leads to new lines of thought and practice, whether expressed by a "new deal" in economic affairs or by a diversion of attention from biological to chemical methods of sewage treatment.

The great interest shown from 1920 to 1930 in biological processes of sewage treatment, such as activated sludge, aerated colloids and separate sludge digestion, has been transferred during the past 2 or 3 years to methods of chemical treatment of sewage, the use of chemicals for treatment of sludge, and the disposal of such sludge.

This new cycle of interest is so recent, and the actual proven advances are so meager that it is impossible to decide at the present time what permanent contribution to the treatment of sewage will result from the present agitation. Therefore one can only list the work

in chemical fields of sewage treatment during the past few years, point out the obvious accomplishments, and predict with some misgivings the outcome of all of the experimental and promotional activity now under way.

During the past 10 or 15 years mechanical equipment has been introduced into sewage treatment practice in this country on a far more extensive scale than was customary during the preceding 30 years. This use of chemical equipment together with the promotion of the sales of chemicals led to a renewed interest in chemical coagulation, which had flourished in the United States in the decade 1890 to 1900, but waned thereafter and had fallen into almost complete disuse. The history of chemical precipitation has recently been reviewed by Reynolds.¹ A careful study of the literature of sewage treatment and of the patents issued from 1870 to 1900 in England, Germany, and the United States would undoubtedly reveal a prior use or knowledge of most of the coagulants now regarded as new and novel by those interested in the promotion of patented processes. From the standpoint of the technician, however, present chemicals and processes should fairly be judged only with due consideration for the improved knowledge and equipment now available for their use. Likewise the results obtained by chemical treatment with all modern equipment must be compared

* Read at a Joint Session of the Central States Sewage Works Association and the Public Health Engineering Section of the American Public Health Association at the Sixty-second Annual Meeting in Indianapolis, Ind., October 12, 1933.

with those obtained by activated sludge or trickling filter plants now operating on a large scale. Unfortunately there are no chemical precipitation plants of any magnitude in operation; so results and costs of operation must be based on small-scale or experimental installations, in comparison with long term records of continuous operation of very large activated sludge plants.

TYPES OF CHEMICALS USED

It is difficult to point out new and novel features of chemical coagulants, with one or two exceptions. Chemicals used, or proposed in recent developments, have included the following:

<i>Addition of Coagulants</i>	<i>Addition of Insoluble Solids</i>
Ferric chloride	Paper pulp
Ferric sulphate	Marl
Ferrous sulphate	Cement dust
Lime	Returned sludge
Chlorine	Ground charred sludge
Alum	
Sodium aluminate	<i>Removal of Soluble Solids</i>
Copper sulphate	Zeolite (Chlorine)

The ferric salts are more commonly used now because of their decreased cost, but all coagulants listed, with the possible exception of sodium aluminate and chlorine, were used years ago. The former has not appeared practicable because of its cost, and chlorine has not been effective as a coagulant on sewage although used with some success on packinghouse wastes.

Insoluble solids of all varieties have been used in the past, including clay, ground peat, powdered lignite, flue dust, and chalk. Undoubtedly more materials of similar type could be suggested and used, and theories expounded to claim superior action.

The use of zeolite is apparently new as a means of removal of ammonia and other soluble substances from sewage, although used for many years for removal of ammonia from distilled water

or other liquids in the laboratory. The use of chlorine to fix or precipitate organic matter may also be considered as a new development, although chlorine was suggested many years ago as an oxidizing agent, in the absence of knowledge of its true rôle when applied to sewage and waste liquors.

The flocs formed from the coagulants listed are of varying composition, but in general are

Ferric hydroxide	$\text{Fe}_2(\text{OH})_6$
Aluminum hydroxide	$\text{Al}_2(\text{OH})_6$
Calcium carbonate	CaCO_3
Magnesium hydroxide	$\text{Mg}(\text{OH})_2$
Copper hydroxide	$\text{Cu}(\text{OH})_2$

The completeness of formation of ferric or aluminum floc depends upon the amount of alkali added. If less than the combining proportion of alkali is added the floc will contain some sulphate or chloride, as shown by Miller and others. When sufficient alkali is present the floc is $\text{Fe}_2(\text{OH})_6$. The pH scale is used to determine the completeness of precipitation.

Alum is an expensive coagulant; sodium aluminate is even more expensive.

Inert or insoluble solids weight the floc and facilitate settling. If used in large enough amounts they may aid dewatering of sludge. A small purifying effect may be ascribed to adsorption of soluble ammonia or organic solids.

RECENT CHEMICAL PROCESSES

A brief description of some of the various chemical processes that have been proposed and operated in the past few years will illustrate the widespread interest in this development. The approximate rate of treatment and chemicals used are indicated in Table I.

These processes could be classified in 5 groups, according to the type of coagulation, as follows:

Ferric Hydroxide plus Zeolite
Guggenheim

Ferric Hydroxide plus Insoluble Solids

Laughlin
Lewis
Travers
Putnam

Ferric or Aluminum Hydroxide, plus Chlorine

Diamond Alkali
Stevenson
Streander
Scott-Darcey
Cabrera

Calcium Carbonate plus Magnesium Hydroxide

Landreth
Miller-Koller

Paper Pulp Filtration

Wright

It is believed that this list includes most of the chemical processes that have been investigated during the past few years, although undoubtedly there are others not known to the author.

DEGREE OF PURIFICATION WITH CHEMICAL PROCESSES

A study of the published and unpublished results of most of the processes listed reveals that the degree of purification attainable by practically all of them lies between that obtainable by plain settling and that obtainable by activated sludge treatment.

Based on the results available to the writer, only the Guggenheim effluent

approaches or equals the degree of treatment obtained by the activated sludge plants at Chicago, Milwaukee, or Indianapolis. Coagulation and settling, with or without added materials, gives reduction of B.O.D. ranging from 60 to 75 per cent, based on sewage of average strength; chlorine may boost this 5 per cent. Suspended matter removals vary from 75 to 95 per cent, the higher removal being reached where filters are used. The bacterial efficiency is usually excellent when sufficient chlorine is used or when caustic alkalinity is present.

ACTIVATED SLUDGE RESULTS

A few comparisons are listed in Table II of the results obtained by activated sludge treatment at Milwaukee, Chicago, and Indianapolis, as compared with some of the available data on chemical processes.

These results are the averages of daily analyses of composite samples. The reductions at Milwaukee are highest of the three plants probably because of the strong sewage treated, as compared with Chicago, and the comparatively large amount of air used as compared with Chicago or Indianapolis. The air

TABLE I
CHEMICAL PROCESSES OPERATED IN RECENT YEARS ON SEWAGE

<i>Name of Process</i>	<i>Where Operated</i>	<i>Approximate Volume Treated, gal./24 hr.</i>	<i>Chemicals and Solids Used</i>
1. Laughlin	Dearborn, Mich. Coney Island, N. Y.	3,000,000	FeCl ₃ or Fe ₂ (SO ₄) ₃ , CaO, Paper Pulp, Cl ₂
2. Guggenheim	Dyckman St., New York, N. Y. No. Side Tr. Wrks., Chicago, Ill.	2,500 25,000 500,000	Fe ₂ (SO ₄) ₃ , CaO, Zeolite NaCl for Zeolite, H ₂ SO ₄ for Ash FeCl ₃ , CaO, Cement Dust, FeSO ₄
3. Lewis	Atlanta, Ga.	500,000	FeSO ₄ , CaO, Marl
4. Travers	Ashland, Ohio	50,000 (?)	Al ₂ (SO ₄) ₃ Cl ₂ , FeCl ₃ and/or CaO FeSO ₄ , CaO, Air
5. Diamond Alkali Co.	Cleveland, Ohio	30,000	FeCl ₃ , Cl ₂
6. Streander	Philadelphia, Pa.	36,000	CaO, (Electric Current)
7. Stevenson	Palo Alto, Calif.	6,000,000	Paper Pulp (CaO)
8. Landreth	Winston-Salem, N. C.	3,000,000	Al ₂ (SO ₄) ₃ , Cl ₂
9. Wright	Rockville Centre, N. Y.	60,000	CaO, CuSO ₄ , Na ₂ CO ₃ , Na ₂
10. Cabrera	Wilmington, Del.	430,000	Al ₂ O ₃ , Cl ₂
11. Miller-Koller	Elmhurst, Ill.	25,000	FeCl ₃ , CaO, Charred Sludge
12. Putnam	Valparaiso, Ind.	5,000,000 (?)	Fe, Cl ₂
13. Scott-Darcey	Oklahoma City, Okla.		

TABLE II

ACTIVATED SLUDGE TREATMENT

REMOVALS OF SUSPENDED SOLIDS AND B.O.D.

Year	Milwaukee		Chicago, No. Side		Indianapolis	
	B.O.D.	Susp. S.	B.O.D.	Susp. S.	B.O.D.	Susp. S.
1930	96.7	94.8	91.8	89.1	92.4	87.8
1931	94.3	92.3	92.7	90.5	92.2	90.3
1932	93.9	91.8	91.7	90.8	90.4	96.6

used, including channels, was as follows in 1932:

Plant	Air, cu. ft. per gallon
Milwaukee	1.63
Chicago, No. Side	0.43
Indianapolis	0.92

CHEMICAL PRECIPITATION RESULTS

A few results are available to show the reduction of B.O.D. and suspended solids by several chemical processes:

LAUGHLIN

Dearborn—Operation on raw sewage for 26 days, as listed by Zack, with a flow of 1.11 m.g.d. shows 91 per cent reduction of suspended solids and 66 per cent reduction of the 5-day B.O.D. in the unchlorinated effluent. Although daily analyses are made at Dearborn, the plant receives Imhoff sludge from the East Side Treatment Works, which is mixed with the West Side sewage and treated by the Laughlin process. The results obtained on this artificial mixture are not considered representative of what can be obtained on sewage of average strength.

Coney Island—Tests over 11 days at an experimental installation at Coney Island, treating 12,800 gal. per day, resulted in a reduction of 84 per cent of the suspended solids and 69 per cent of the B.O.D. (unchlorinated). Chlorination at the rate of 62 lb. per m.g. increased the suspended solids reduction to 92 per cent and the B.O.D. reduction to 79 per cent.

GUGGENHEIM

Chicago—Results at the North Side Treatment Works in Chicago have not as yet been summarized, but the reduction of suspended solids will average around 95 per cent and of B.O.D. around 90 per cent, on a flow of 25,000 gal. per day.

Results at Dyckman Street in New York were reported by Gleason and Loonam to show 99.5 per cent reduction of suspended solids and 96.7 per cent reduction of B.O.D., on a flow of 2,500 gal. per day.

LEWIS

Atlanta—Operation for 7 days at maximum efficiency, considered as applicable where most exacting requirements are necessary, showed a reduction of 76 per cent of the suspended solids and 77 per cent of the 5-day B.O.D. The amount treated was about 500,000 gal. per day.

TRAVERS

Ashland, Ohio—Tests recently made over a period of 12 days, with an average flow of 500,000 gal. per day, gave approximately 85 per cent reduction of the suspended solids and 50 per cent reduction of the B.O.D.

STREANDER

Streander has claimed that his process will give 75 per cent reduction of the B.O.D. and that the effluent is

"clear and sparkling." The coagulated settled effluent was passed through a sand filter.

STEVENSON

Stevenson stated some months ago that the experiments at Palo Alto indicated that "it will be possible with this type of treatment to effect a removal of 95 per cent of the suspended solids and at least 95 per cent reduction of B.O.D." Chemicals for this degree of treatment were estimated at 250 lb. chlorine and 200 lb. ferric chloride per m.g. Further data in more detail should be submitted to confirm these hopes.

LANDRETH

Although the Winston-Salem plant has been in operation for 7 years, little information of authoritative character is available concerning the removals of B.O.D. and suspended solids. Thrasher in 1929 reported a reduction of 88 per cent of the B.O.D. and 87 per cent of the suspended solids, based upon a so-called "typical analysis" representative of 3 years' operation.

Earlier tests of the Landreth process were reported at Allentown, Pa., in 1926. The process was abandoned later and a new Imhoff tank-trickling filter plant installed and put into operation in 1929.

As an indication of the possibilities in the use of lime to the point of caustic alkalinity, as a precipitant of sewage, experimental tests were made in the laboratories of the Sanitary District of Chicago in 1923. The reduction of 5-day B.O.D. in 11 series of tests at the 39th Street Laboratory averaged 66 per cent and in 12 series of tests at the Des Plaines Treatment Works Laboratory 72 per cent.

CABRERA

Cabrera claimed 89 per cent reduction of suspended solids and 78 per cent

reduction of B.O.D. No detailed results have been published.

OTHER CHEMICAL PROCESSES

Results obtained by the Diamond Alkali Company and the Wright processes have not been reported. It is doubtful whether any representative B.O.D. results are available for the Miller-Koller and Putnam processes. The work by Scott is apparently on an ample scale and the results will be of interest when available.

These comparative results indicate that the recent data on chemical processes are as yet meager and somewhat unconvincing, as compared with the well demonstrated efficiency of the activated sludge process. The preceding conclusion that chemical treatment processes, with the exception of the Guggenheim process, do not equal the degree of treatment of the activated-sludge process, seems to be reasonable and supported by the facts now available.

Some rather loose criticism has been directed against the activated-sludge process because of its biological nature. One of the more imaginative of the statements indicting the biological kingdom was to the effect that:

... it is not only a difficult matter to breed, train, and educate microscopic life, but at times impossible to harness and compel these invisible microorganisms to work consistently and continuously, as they are not only structurally delicate but clannish and apparently highly unionized. Food supply and working conditions must be exactly according to their liking or they in a body refuse to work and so obstinate is their nature that rather than work under unfavorable conditions, they prefer to lie down and die, and thereby throw the entire biological machine out of gear.

The results of operation of the larger activated sludge plants hardly support this pessimistic opinion of the obstinacy of microorganisms, which would prefer to go on a hunger strike and die

rather than submit to a daily fare of unpalatable sewage nutriment.

The vagaries of biological life in the activated-sludge process have been exaggerated, in the writer's opinion. While there is considerable literature on "bulking" and occasional instances of inferior operation can be found, the decreased efficiency is usually transitory and monthly average results are not seriously impaired.

SLUDGE DISPOSAL

Sludge produced by chemical processes has several advantages and several disadvantages:

Advantages

1. Usually filters well on mechanical filters.
2. Moisture content of filter cake is usually lower than the moisture content of filtered fresh or digested sludge.
3. If loaded heavily enough with lime, or other inorganic solids, filter cake may not be objectionably odorous.

Disadvantages

1. Dry weight varies from 2 to 3 times the dry suspended solids removed from the sewage, due to the precipitation of inorganic solids, particularly on hard waters.
2. Chemically precipitated sludge generally will not digest satisfactorily.
3. Unless dosed with excessive amounts of lime, chemically precipitated sludge may produce objectionable odors when piled in a heap.
4. As yet no method of disposal of chemically precipitated sludge has been operated successfully on a large scale.

For large plants the most feasible method of disposal of chemically precipitated sludge appears to be by mechanical filtration and incineration. This procedure is inherent in the Guggenheim process, and incineration has been suggested for the Dearborn plant. The sludge from the Wright

vacuum filter at Rockville Center has been incinerated, but this sludge contains a large proportion of paper pulp.

The cost of incineration of chemically precipitated sludge per m.g. of sewage or per capita will probably be greater than that of fresh or digested sludge, because of the excess weight of precipitated solids and the low *B.t.u.* content.

ADVANCES IN CHEMICAL TREATMENT

A comparison of the present development in chemical treatment of sewage with the procedure of three decades ago indicates that we now have more accurate methods of control of coagulation by use of the pH scale and by means of mechanical flocculators; we now have a better measurement of the results of treatment as expressed by the reduction of the biochemical oxygen demand; mechanically-cleaned settling tanks are now used almost universally, whereas their use was formerly quite limited.

New coagulants are better and more effective than the lime and copperas used formerly. Ferric chloride in liquid form is convenient and much cheaper than it was even 5 years ago. A very effective ferric sulphate is now available. Chlorine is used as a germicide with more accurate control than was formerly obtained with chloride of lime.

The use of zeolite for filtration of chemically clarified sewage is an interesting and novel development. It provides a final step which makes it possible to extend the ordinary range of effectiveness of chemical precipitation to what is called complete treatment. The practical value and cost should be demonstrated on a larger scale.

Mechanical filters for coagulated effluents appear to have possibilities for final clarification of the flocculated and settled sewage. A study of costs should

demonstrate whether it is preferable to use such filters with short periods of settling, or whether similar clarification can be obtained at less cost by providing a longer settling period, without operation of final mechanical filters.

Experience over the past 5 years has demonstrated the value of continuous vacuum filters for initial dewatering of sludge. Quite high rates of filtration of chemically precipitated sludge have been obtained recently on the Oliver filters at Dearborn, although not any higher than have been obtained with conditioned sludge at Chicago, Columbus, or Baltimore. Because of the added weight of precipitated solids in the chemical sludge, rates twice as high as those obtained with unprecipitated sewage solids ought to be obtained for equal areas of vacuum filters.

Although filtration on vacuum filters facilitates the initial step in the disposal of chemically precipitated sludge, the filter cake presents the same problem of disposal as was faced years ago at Worcester and Providence. The failure to incorporate incineration of the cake in any of the present chemical processes, with the exception of the Guggenheim, is probably the most unsatisfactory aspect of the recently proposed processes of chemical treatment. Even in the Guggenheim process, drying and incineration has been on too small a scale to demonstrate conclusively the efficiency, cost, and freedom from odor of the incineration procedure.

FIELD OF USEFULNESS FOR CHEMICAL PROCESSES

Chemical coagulation of sewage is practised at a number of plants in England, including Leeds, Barnsley, Dewsbury, and Kingston, where additional clarification is required in excess of that produced by passing the sewage through plain settling tanks. In the United States the increased degree of treatment obtainable with chemicals

has been investigated in a preliminary way at Grand Rapids, Mich., Plainfield, N. J., and Oklahoma City, Okla. Likewise Tatlock at Dayton has claimed a considerable improvement in the degree of treatment in Imhoff tanks by application of relatively small amounts of lime and chlorine, used primarily for odor control.

Such uses of chemicals in existing plants may show more progress in the next few years than the adoption of patented chemical processes. However, there appears to be a need for some cheaper process than activated sludge or trickling filters, in situations where for many months the volume of diluting water is not sufficient for a settled effluent, but more than sufficient for a completely treated effluent. In some cases the presence of a large amount of industrial wastes in sewage may threaten the uniformity of operation of any biological process; in such situations chemical treatment may be indicated. It is possible that the control of chemical processes may be so improved that various degrees of treatment may be obtained by varying the dosage of chemicals. This flexibility of operation has been claimed for chemical treatment, but not much proof of such flexibility is available in the form of long-term operating records.

For the final evaluation of chemical precipitation processes of sewage treatment, many factors require study under careful supervision on a large scale. Among these are the accumulation of operating results and costs and the perfection of chemical control and sludge disposal. Chemical coagulation undoubtedly has a field of usefulness intermediate between settling and complete biological treatment if the problems of control, cost and sludge disposal can be solved by large-scale operation.

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Erysipeloid Condition Among Workers in a Bone Button Factory Due to the Bacillus of Swine Erysipelas*

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SWINE erysipelas, or "diamond skin disease," is primarily a communicable disease of hogs caused by *Erysipelothrix Rhusiopathiae*. Organisms indistinguishable from those found in infected swine have also been isolated from sheep, birds, and fish suffering from a similar condition. The disease was first studied by Pasteur in 1882. He demonstrated a method of immunization by use of an attenuated culture which was obtained by passing the organisms through rabbits, which are relatively resistant to this infection. Some doubt exists as to the purity of the cultures used by Pasteur, and the first complete description of the bacillus of swine erysipelas has been credited to Loefler¹ in 1885. Jensen, in 1891, described a diamond shaped skin lesion in hogs due to the bacillus of swine erysipelas. In 1892, Bang described a verrucose endocarditis caused by this organism. Prausnitz,² in 1921, collected data on approximately 100 cases of human infections with this organism. In the same year Dumont and Cotoni³ described a case of meningitis and isolated a similar organism from the spinal fluid. In 1926, Klauder, Richter and Harkins⁴ published a complete and

accurate description of a number of human infections occurring among New Jersey fishermen. In 1930, Stefansky and Grunfeld⁵ reported 200 cases of infection with bacillus of swine erysipelas occurring among fresh water fish handlers in Odessa. Ingestion of raw sausage made from the meat of swine dying with erysipelas has been reported as causing intestinal infection in man.

During the first 10 months of operation of a bone button factory in Buchanan, Va., 210 cases of erysipeloid occurred among workers in the plant according to information supplied by the plant physician. The clinical study of these cases made by Drs. Lawson and Stinnett⁶ led to the diagnosis of erysipeloid probably due to the bacillus of swine erysipelas.

CLINICAL MANIFESTATIONS

Briefly, the clinical manifestations of the disease were a progressive local swelling, dusky purple discolorization with pain and extreme tenderness of the infected part. There was local heat but no elevation of body temperature. Suppuration was extremely rare, and there was only occasional slight lymphangitis and lymphadenitis. These symptoms appeared usually 3 or 4 days following a superficial injury, usually to an exposed part. The duration of the dis-

* Read before the Epidemiology Section of the American Public Health Association at the Sixty-second Annual Meeting in Indianapolis, Ind., October 7, 1935.

ease ranged from 9 to 21 days. In approximately 90 per cent of the cases the lesions occurred on the hands. There were 5 cases of severe conjunctivitis resulting from bone dust and 3 cases of severe bronchial infection from the inhalation of bone dust. In 1 case the lesion occurred on the knee following a bruise, and in another the lesion appeared on the foot following laceration by a piece of bone.

EPIDEMIOLOGICAL INVESTIGATION

At the request of Drs. Lawson and Stinnett, an epidemiological and bacteriological study of this outbreak was made in September, 1931, by the State Department of Health. At this time there were 103 white men, 33 white women, and 6 colored men employed in various capacities in the plant. A careful epidemiological and clinical history was taken of each employee. A survey was made of the plant, and each process of operation was studied.

This button manufacturing company formerly operated in Pennsylvania and many of the employees stated that they had had similar infections while working there. The first case in this outbreak occurred about 3 months before the opening of the plant in a person who was engaged to unload the bone, and followed an injury to the foot by a sharp spicule of bone which pierced the shoe. Another case occurred in a person in no way connected with the plant but who used bone meal from this plant as a fertilizer on his garden.

Only adults were employed. Both sexes were affected, but the majority of the cases occurred in males. No women, however, were employed in operations requiring the handling of raw wet bone. Only 6 colored persons were employed, all of whom handled rough wet bone, and among these, 3 had attacks of erysipeloid. The largest number of cases occurred during November and December, but during no season was the plant

entirely free of cases. Fifty per cent of the cases gave a history of a previous attack, frequently on the same hand, indicating that there is little or no local or general immunity produced by an attack.

Cattle and hog bones for use in this plant were obtained from various places, among which were England, Uruguay, Argentina, and Seattle, Wash. The bones were received in carload lots and were well cleaned, though occasionally a little "green" with a slight odor. After reaching the plant they were soaked in large vats of warm water to soften before sawing. Both long and flat bones are used. They are sawed into thin strips on circular power saws, which are kept wet by a stream of water. There is a considerable accumulation of moist bone dust on and around the saws. Between 30 and 60 men are employed in working on the saws, and minor injuries, usually to the hands, are frequent. The thin sheets of bone are carried by hand-truck to the punching machines, which are also kept moist by running water, and there is an accumulation of wet bone dust and fragments of bone on and around the machines. From 50 to 75 men are employed on punching machines, and minor hand injuries are frequent among this group. Six or 8 laborers transfer the bones and the punched buttons to and from the machines. Following the punching of the buttons from the bone they are dried and sent to the sorters and finishers where they are polished, finished, and dyed. Thirty to 50 sorters and finishers are employed and they handle only dried buttons, and injuries are relatively infrequent. Table I shows the attack rate per cent in various groups of workers in the plant.

It may be seen from the tabulation that the infection was correlated with the mechanical occupations of sawing or cutting bones, both occupations requiring the handling of wet bone, and in

TABLE I

ATTACK RATE PER CENT FOR VARIOUS GROUPS OF WORKERS IN THE BONE BUTTON FACTORY

Occupation	No. Employed			No. Attacked			Attack Rate Per Cent
	M.	F.	Total	M.	F.	Total	
Cutters	53	0	53	27	0	27	50.9
Sawyers	29	0	29	18	0	18	62.1
Sorters	1	32	33	0	1	1	3.0
Laborers	6	0	6	3	0	3	50.0
Mechanics	5	0	5	0	0	0	0.0
Finishers	4	0	4	0	0	0	0.0
Bone meal workers	3	0	3	1	0	1	33.3
Foremen	2	0	2	1*	0	1	50.0
Electrician	1	0	1	0	0	0	0.0
Stock room man	1	0	1	0	0	0	0.0
Packer	1	0	1	0	0	0	0.0
Fireman	1	0	1	0	0	0	0.0
File cutter	1	0	1	0	0	0	0.0
Caretaker	1	0	1	0	0	0	0.0
Boiler room man	1	0	1	0	0	0	0.0
Total	110	32	142	50	1	51	35.9

* Injured hand in saw room

both traumatic injuries to the skin are frequent.

BACTERIOLOGICAL CONFIRMATION

At the time of the investigation there were 2 cases of erysipeloid in the acute stage. Both gave a history of having been recently injured at the sites of infection by sharp pieces of bone, 1 below the knee and 1 on the great toe. Sterile normal salt solution was injected into the area around each wound, and a small quantity of fluid was aspirated. Samples of material were also obtained from the following units of operation:

1. Aqueous material from a vat used to soften bone previous to sawing
2. Waste bone material obtained from teeth of saws in a moist state
3. Waste bone material from button punching machines in a moist state
4. Pulverized bone meal sold from the plant for fertilization of soil.

Because of the belief that the original bones might have been the source of infection, samples of bone shipped from Seattle, Uruguay, and Argentina were obtained from shipments before contamination with local material, or

handling could occur. The fluid obtained from the human cases and the various samples taken at the plant were injected subcutaneously into white mice, and guinea pigs were inoculated subcutaneously with vat and saw waste material. Guinea pigs inoculated with bone waste material showed no pathology suggestive of infection with the bacillus of swine erysipelas. Table II shows the results of the mouse inoculations.

An organism identical in morphology and cultural characteristics to bacillus of swine erysipelas was isolated at autopsy from the peritoneal exudate and hearts' blood of mice. These organisms were agglutinated by swine erysipelas serum obtained from Dr. John Buckley, of the Bureau of Animal Pathology, U. S. Department of Agriculture, who also confirmed the identity of the organism isolated from the fluid aspirated in the human case.

SUMMARY AND CONCLUSIONS

Two hundred and ten cases of an erysipeloid condition occurred in a bone

TABLE II
MOUSE INOCULATIONS

Source Material	Number Specimens Examined	Days Survived	Results
Fluid aspirated from human lesions	2	12 Not fatal	Pos. B. swine erysipelas Negative
Vat water	3	7 9 12	Pos. B. swine erysipelas Pos. B. swine erysipelas Pos. B. swine erysipelas
Saw waste	3	8 12	Pos. B. swine erysipelas Pos. B. swine erysipelas
Button machine waste	2	8 Not fatal	Negative Pos. B. swine erysipelas
Dry bone meal	3	12 7	Pos. B. swine erysipelas Pos. B. swine erysipelas
Uruguay (Round bone)	1	2	Pos. streptococci
Uruguay (Flat bone)	1	8	Pos. B. swine erysipelas
Uruguay (not stated)	1	3	Pos. streptococci
Argentine (not stated)	1	2	Pos. streptococci
Seattle, Wash. (not stated)	1	3 9	Pos. streptococci Pos. B. swine erysipelas

button factory among individuals handling cattle or hog bones. There was a close correlation with the handling of wet bone and occupations in which injuries were frequent. Repeated attacks of the disease were frequent, indicating that there was little or no local or general immunity produced by an attack. The bacillus of swine erysipelas was isolated from 1 case and from samples of bone, bone material, and bone waste collected at various stages in the manufacture of buttons. For ridding the plant of the

infection we recommend the heating of all bones entering the plant in the soaking vats to a temperature of 144° for at least 2 hours.

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Brazil—National Conference on Child Welfare

A NATIONAL conference on child welfare was held in Rio de Janeiro, Brazil, from September 17 to September 27, 1933, under the auspices of the President of the Republic. The work was divided into the following sections: assistance, education, health, medicine,

and legislation. Much time was devoted to a program of urgent child welfare work, which is to be recommended to the authorities for earliest possible consideration. — *Jornal de Brasil*, Rio de Janeiro, Sept. 17–27, 1933.

Arsenic in Tobacco Smoke

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IN some of the tobacco growing sections of the United States, it is necessary to dust the plants with arsenicals during the growing season in order adequately to control insect pests. Lead arsenate is the insecticide most commonly used, but in some cases, particularly with plantings of cigar wrapper tobaccos, Paris green is employed.

Remington¹ apparently was the first to call attention to the presence of arsenic in commercial tobacco products. He found that samples of American pipe-smoking and chewing tobaccos carried arsenical residues ranging from 0.05 to 0.27 gr. of As_2O_3 per lb. (7 to 38.5 p.p.m.). In addition, he reported the hitherto unknown facts that about 50 per cent of the arsenic in the smoking tobaccos was volatilized in the smoke and that about 50 per cent of the arsenic in chewing tobaccos was water-soluble. Inasmuch as Remington devoted his study largely to pipe-smoking and chewing tobaccos, it is believed that the results of similar investigations made by the Insecticide Division on cigars, cigarettes, and smoking tobaccos will be of interest. The description of the smoking apparatus used in making these tests will also be of value.

SMOKING APPARATUS DEVISED TO CARRY OUT THE SMOKING TESTS

The apparatus devised to carry out the smoking tests is shown diagrammatically in Figure I. It was operated as follows: In order to imitate as nearly as possible normal smoking conditions, the apparatus was designed to

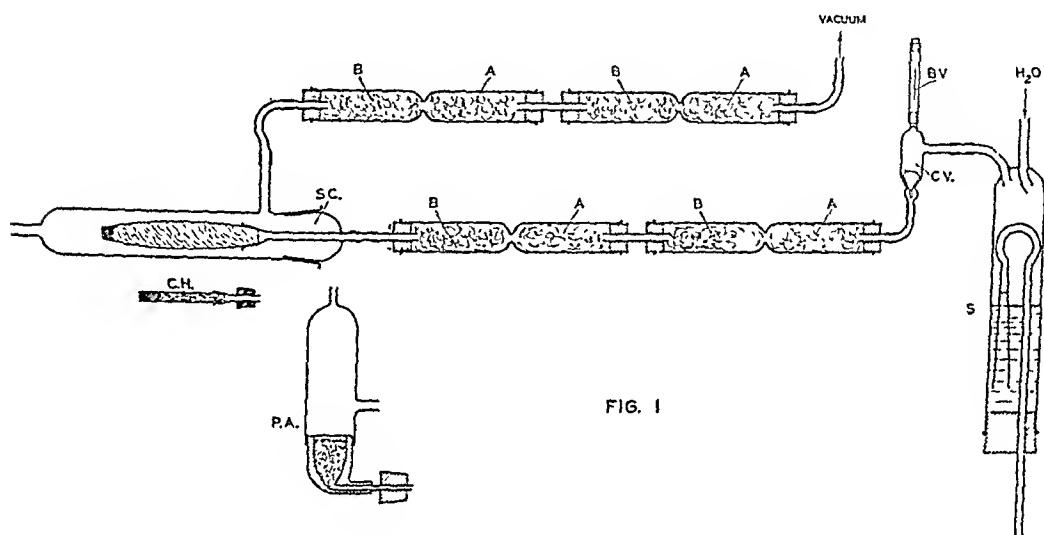
draw intermittently. This was accomplished by using a small water syphon (S) by which approximately 50 c.c. of air was drawn through the apparatus at each discharge. This air, with its unabsorbed smoke constituents, was prevented from returning into the absorption chambers by means of a check valve (CV), and was discharged into the atmosphere through the Bunsen valve (BV).

The smoke from the cigar, cigarette, or pipe was pulled by the syphon through an absorption train, consisting of two glass tubes about 20 cm. long and 2.0 cm. in diameter, each being constricted to about half the outside diameter at its mid-point. The absorbing material was absorbent cotton, moistened with 5 c.c. 1 per cent NaOH in (B) and 5 c.c. 3.5 per cent HCl in (A). Test runs showed that all the arsenic in the smoke was caught in the tube next to the smoking chamber (SC), but the second tube was retained as an additional safety measure.

The smoking chamber assembly (SC) consisted of a cigar holder, into which could be inserted a cigarette holder (CH) an ash tray (not shown in sketch) placed under the cigar or cigarette, and a glass jacket fitted with a ground glass joint and two side tubes. One side tube was left open for the entrance of air, while the other was connected by a rubber tube to a second absorption train, which in turn was connected to a continuous aspirator. The arsenic in any smoke given off between "draws" was thus absorbed in

this train. In testing smoking tobaccos, the tobacco could either be smoked in a pipe or be made into cigarettes and smoked in this way. In our tests the pipe was used, in which case the smoking chamber assembly was re-

and water was run into the syphon chamber at the rate of about 150 c.c. per minute. As soon as the syphon was functioning properly and discharging at the rate of about 3 times per minute, the cigar or cigarette or pipe was



placed by the pipe assembly (PA), and the tests were carried out thereafter in the same manner as for cigars and cigarettes.

While this apparatus was designed primarily for the determination of arsenic in tobacco smoke, other constituents of the smoke or tar could also be determined by its aid. For example, nicotine could be determined by the method of Waser and Stähle (*Z. Unters Lebensm.* 64:470-85, 1932); pyridine and ammonia by that of Schaarschmidt (*Chem. Ztg.* 56:911-13, 1932); and the compounds in the tarry matter could be ascertained by special methods used in organic analysis. The presence or absence of lead, copper, or fluorine in the smoke could also be easily determined.

METHOD OF MAKING SMOKING TESTS

After the apparatus had been assembled and the absorption tubes charged, a cigar or cigarette or loaded pipe was inserted into its proper holder,

lighted, and the jacket of the smoking chamber was put in place.

When the cigars and cigarettes were smoked down to about $\frac{1}{2}$ " to $\frac{3}{4}$ ", the apparatus was disconnected and the ash, butt and absorbents in both trains were reserved for individual analysis. (In the pipe-smoking tests, the entire pipe load was smoked.) Any tarry matter which had condensed in the holder, was removed with alcohol and added to the absorbents from the lower train, while the tarry substance deposited on the inside wall of the jacket was combined with the absorbents in the upper train.

ANALYTICAL PROCEDURE

All arsenic analyses were made by the method developed by Gross² which eliminates the low results occurring when analysis is made by the Gutzeit method in the presence of undigested residues of the tobacco alkaloid nicotine. In this method the material is digested in the usual manner with nitric

and sulphuric acids, and a suitable aliquot of the diluted solution is made ammoniacal and precipitated with ammonium phosphate and magnesia mixture. The co-precipitated magnesium ammonium phosphate and arsenate is then filtered and rinsed free of interfering nicotine residues, redissolved in hydrochloric acid solution, and analyzed for arsenic by the Gutzeit method, according to the A.O.A.C. procedure.³

QUANTITIES OF ARSENIC IN TOBACCO PRODUCTS STUDIED

Five widely sold domestic brands of cigars, 5 of cigarettes, and 4 of smoking

tobacco were selected for experimentation. Before the smoking tests were conducted, preliminary analyses were made on representative samples of each of the brands to determine the range of arsenical residues present. The analyses were made on analytical units composed of either 1 cigar, 4 cigarettes, or 5 gm. of smoking tobacco. Five such analytical groups were analyzed for each brand studied. The results of these analyses together with those made in the smoking tests reported later were calculated as p.p.m. of As_2O_3 . For general comparison purposes this form of expression was deemed preferable to

TABLE I
TOTAL ARSENIC PRESENT IN TOBACCO PRODUCTS

Brand No.	Av. Wt. Sample (grams)	As_2O_3 in Parts per Million					
		Tests					
		1	2	3	4	5	Average
	1 Cigar			Cigars			
1	8.67	15.3	48.4	16.5	27.1	20.9	25.9
2	6.27	48.4	21.9	11.6	28.6	22.8	26.6
3	7.33	23.0	26.7	19.3	21.7	17.7	21.7
4	8.28	12.1	10.6	14.7	9.7	11.0	11.6
5	9.10	11.9	30.4	11.1	8.3	17.1	15.7
	4 Cigarettes			Cigarettes			
1	3.76	25.6	22.9	21.3	20.7	23.7	22.9
2	4.24	26.7	24.4	24.4	23.6	21.1	24.1
3	4.46	33.6	25.3	36.3	35.4	35.3	33.2
4	4.25	13.0	12.0	9.7	11.1	12.0	11.6
5	4.20	22.9	24.6	25.7	24.4	26.1	24.7
	Weighed Portions			Pipe Tobacco			
1	5.00	44.0	40.0	44.0	50.0	48.0	45.1
2	5.00	42.0	40.0	36.0	38.0	36.0	38.4
3	5.00	32.0	30.0	34.0	34.0	28.0	31.6
4	5.00	34.0	36.0	28.0	32.0	26.0	31.1

calculations made in terms of gr. of As_2O_3 per lb. of sample. Table I shows the amounts of arsenic found in the brands of tobacco analyzed.

The data show a maximum of 48.4, 36.3, and 50.0 p.p.m. of As_2O_3 , respectively, for the cigars, cigarettes, and smoking tobaccos studied. These figures are not conspicuously higher than the maximum of 38.5 p.p.m. found by Remington for arsenic in smoking and chewing tobaccos.

Quite a variation is apparent in the arsenical load carried by individual cigars of the same brand. In cigarettes and pipe tobaccos the variations in arsenical content in any given brand lie within much narrower limits. This is probably due to the mixing such tobaccos receive during the commercial blending process.

DISCUSSION AND RESULTS OF SMOKING TESTS

Analytical units similar to those mentioned above were used in the smoking tests. After smoking either 1 cigar (usually weighing between 6 and 8 gm.), 4 cigarettes (total weight about 4 gm.) or 3 pipeloads of tobacco (adjusted to total 5 gm.), the arsenic was determined in (1) the absorbents of the lower train (containing the arsenic present in the puffed smoke), (2) the absorbents in the upper train (representing the arsenic in the smoke between puffs), (3) the ash, and (4) the butts (except on pipe tobaccos where all the tobacco was smoked).

The results obtained during the smoking tests calculated as p.p.m. of As_2O_3 are given in Table II. Since in all 70 smoking tests were made, and each test for cigars and cigarettes required 4 different analyses, and each on pipe tobaccos 3, the completed data would be too voluminous for expression here. Therefore only the average results from each brand investigated are included in this table.

An exception is made of cigar brand No. 1, which is given in detail, in order to show the method of averaging the data as well as the approximate range of arsenical residues encountered.

All calculations of p.p.m. of As_2O_3 in Table II are based on the original weight of the sample smoked. The totals in the last column agree quite closely with those obtained for the same brands and given in Table I, indicating that the samples tested were representative of the brand.

The data resulting from these smoking tests furnish the opportunity for drawing interesting comparisons between the quantities of arsenic a smoker may inhale and the quantity permitted by law in food products, which is 1.43 p.p.m. (0.01 gr. of As_2O_3 per lb.). The average figures for p.p.m. in the puffed smoke show that a smoker may draw into his mouth the quantity tolerated in 1 lb. of food by the smoking of 1.35 lb. of cigars, 0.56 lb. of cigarettes or 0.16 lb. (about 2.6 oz.) of pipe tobacco. Of course, some of the arsenic is still in the smoke when it is exhaled, and therefore it is different from arsenic in food, in which case the body is exposed to all the arsenic present.

Attention is called to the relatively small quantity of smoking tobacco required to furnish volatile arsenic in the quantity mentioned. Several factors contribute to bring this about. (1) The brands of smoking tobacco tested contained more arsenic than the cigar and cigarette brands. (2) When a pipe is smoked, apparently most of the volatile arsenic is contained in the puffed smoke, due to the dying down of the ember between puffs. In the case of cigars and cigarettes, the amounts of arsenic in the unpuffed and puffed smoke are about equal. (3) All the tobacco was smoked, while with cigars and cigarettes, about 22 per cent was discarded in the butts. (4) A con-

TABLE II

ARSENIC IN UNPUFFED AND PUFFED SMOKE, ASH AND UNSMOKED PORTIONS OF CIGARS, CIGARETTES, AND SMOKING TOBACCOS

Brand No.	Weight Sample* (grams)	As ₂ O ₃ Parts per Million				
		Unpuffed Smoke	Puffed Smoke	Ash	Butts	Total
		Cigars, Individual Analyses, Brand 1				
1, Cigar 1	9.48	1.79	1.37	25.32	4.74	33.22
1, " 2	8.20	1.21	0.98	14.63	9.76	26.58
1, " 3	8.54	1.17	1.52	15.58	5.85	24.12
1, " 4	8.81	1.48	1.14	14.19	7.15	23.96
1, " 5	8.28	1.09	1.57	12.08	8.45	23.19
Av. Wt., (g)	8.66					
Av., (p.p.m.)		1.35	1.31	16.36	7.19	26.21
Av., (per cent)		5.15	5.00	62.42	27.43	100.00
		Cigars, Averages, Each Brand				
1	8.66	1.3	1.3	16.4	7.2	26.2
2	5.97	1.2	1.5	15.2	6.7	24.6
3	7.54	1.2	1.1	13.1	5.4	20.8
4	8.00	0.8	0.7	6.6	2.6	10.7
5	9.06	1.0	0.7	8.8	6.2	16.7
Av. Wt., (g)	7.85					
Av., (p.p.m.)		1.1	1.1	12.0	5.6	19.8
Av., (per cent)		5.6	5.5	60.6	28.3	100.0
		Cigarettes, Averages, Each Brand				
1	3.83	3.7	3.7	9.5	6.2	23.1
2	4.23	2.8	1.7	11.7	6.5	22.7
3	4.42	2.8	2.7	16.3	10.2	32.0
4	4.31	1.7	1.4	6.9	3.0	13.0
5	4.16	3.1	2.9	11.2	6.2	23.4
Av. Wt., (g)	4.19					
Av., (p.p.m.)		2.8	2.5	11.1	6.4	22.8
Av., (per cent)		12.3	11.0	48.6	28.1	100.0
		Smoking Tobaccos, Averages, Each Brand				
1	5.00	1.5	12.4	28.8	....	42.7
2	5.00	1.2	8.8	28.2	....	38.2
3	5.00	1.4	8.0	19.3	....	28.7
4	5.00	2.5	6.7	20.4	....	29.6
Av. Wt., (g)	5.00					
Av., (p.p.m.)		1.6	9.0	24.2	....	34.8
Av., (per cent)		4.6	25.9	69.5	....	100.0

* Samples composed of 1 cigar, 4 cigarettes, or 5 grams of smoking tobacco.

siderable portion of the volatile arsenic is absorbed by or condensed in the butts of cigars or cigarettes. The way in which this fact was demonstrated will

be described later. The pipe smoker who smokes all the tobacco does not therefore have the protection afforded by the butts of cigars and cigarettes.

FORM IN WHICH VOLATILIZED

Whether or not the volatile arsenic in tobacco smoke is free or in combination has not been conclusively determined. From theoretical considerations it is believed that the arsenic is volatilized as As_2O_3 , to which form it has been converted by the conditions of incomplete combustion present during smoking. As_2O_3 would behave in the manner observed, subliming at the temperatures reached during smoking and tending to condense again on cool moist surfaces as represented by the butts. The ab-

sorbent cotton moistened with distilled water caught nearly all the arsenic present in the smoke. This fact is not reassuring when it is called to mind that the tissues of the mouth and lungs are normally moist.

PER CENT OF VOLATILE ARSENIC

Remington's pipe smoking tests indicated that about 50 per cent of the arsenic was volatile. The results of our own investigations, as shown in Table III, indicate maxima of 34.7, 41.3 and 32.8 per cent respectively, for

TABLE III

PERCENTAGES OF ARSENIC VOLATILIZED DURING SMOKING OF CIGARS, CIGARETTES, AND SMOKING TOBACCOS

Brand No.	No. of Tests Made *	Av. Wt. (grams)		Percentage of Total Arsenic of Smoked Portion Found			
		Butts	Smoked Portion	In unpuffed smoke	In puffed smoke	Absorbed by butts	Total
Cigars							
1	3	1.92	6.62	6.8	7.6	9.8	24.2
2	3	1.57	4.57	5.8	7.9	1.4	15.1
3	3	1.62	5.88	7.3	7.1	5.8	20.2
4	4	1.70	6.50	9.4	7.9	3.9	21.2
5	3	1.94	7.15	8.3	5.6	20.8	34.7
Averages		1.75	6.14	7.5	7.2	8.3	23.0
Average wt., per cent		22.2	77.8				
Cigarettes							
1	3	0.94	2.90	16.4	14.0	10.9	41.3
2	2	1.02	3.38	14.9	8.9	10.9	34.7
3	5	1.08	3.34	11.4	11.2	9.6	32.2
4	5	0.90	3.41	16.4	13.3	2.7	32.4
5	5	0.84	3.32	16.8	15.4	7.7	39.9
Averages		0.96	3.27	15.2	12.6	8.3	36.1
Average per cent		22.7	77.3				
Smoking Tobaccos							
1	5	.....	5.00	3.5	29.0	.....	32.5
2	5	.....	5.00	3.1	23.0	.....	26.1
3	5	.....	5.00	4.9	27.9	.....	32.8
4	5	.....	5.00	8.4	22.7	.....	31.1
Averages				5.0	25.6	.....	30.6

* Each test composed of 1 cigar, 4 cigarettes, or 5 grams of smoking tobacco.

the brands of cigars, cigarettes, and pipe tobaccos tested.

These figures were obtained by adding the quantities of arsenic contained in the unpuffed and puffed smoke and the quantity absorbed from the puffed smoke by the butt. This last quantity was ascertained by calculating the amount of arsenic that should be contained in the butts, knowing the weights of the entire cigar or cigarette, the weight of the butts, and the total weight of arsenic present, then subtracting this theoretical weight from that actually found by analysis.

The wide variations in the percentages absorbed by the butts, as shown in Table III, cannot be readily explained. They may be due to differences in moisture content or probably to the degree of packing of the tobaccos. However, the average results for percentages of arsenic absorbed should be reassuring to cigar and cigarette smokers and to pipe smokers who empty their pipes before reaching the "last drag."

SUMMARY

1. An apparatus is described for use in determining volatile arsenic and

other substances evolved during the smoking of cigars, cigarettes, and pipe tobacco.

2. Analyses of popular domestic brands of cigars, cigarettes, and smoking tobaccos show a range from 8.3 to 50.0 p.p.m. of As_2O_3 as compared with a range of 7 to 38.5 p.p.m. found by Remington in domestic smoking and chewing tobaccos.

3. On the basis of average figures, the arsenic inhaled in smoking 1.35 lb. of cigars, 0.57 lb. of cigarettes or 0.16 lb. (2.6 oz.) of pipe tobacco is calculated to be equivalent to that present in 1 lb. of food containing 1.43 p.p.m. of As_2O_3 which is the maximum permitted by law for food products.

4. The proportion of total arsenic volatilized during smoking ranges for cigars from 15.1 to 34.7 per cent, for cigarettes from 32.2 to 41.3 per cent, and for pipe tobaccos from 26.1 to 32.8 per cent. Remington reported about 50 per cent volatile in similar tests on pipe tobaccos.

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"Healthmobile" in Maryland

SEVEN counties in southern Maryland and on the eastern shore were visited by the "Healthmobile" of the Bureau of Child Hygiene of the Maryland State Department of Health on its tour this summer. During the eleven weeks of the tour, 85 communities were visited and 89 health conferences were

held for the examination of infants and children under school age. Of 1,589 children examined, 1,137 needed follow-up care of some sort, about 216 were underweight, and 142 had unhealthy tonsils. Of the total number, 1,341 children were given dental examinations and 767 were treated by the dentist.

Responsibility for the Health Program

A DISCUSSION

CHARLES F. WILINSKY, M.D., F.A.P.H.A. (*Life Member*)

*Deputy Commissioner, Child Hygiene Division and Director of Health Units,
Department of Health, Boston, Mass.*

I SUBSCRIBE most heartily to the principle stressed by Dr. Fishbein that the physician should be the key man in matters affecting the health of the people, but I am content that the reason the general practitioner is not occupying this position more frequently is because of laxity and failure on his part rather than because of the fault of health officers or organized groups. The staggering maternal mortality in the United States, the high infant death rate during the first 2 weeks of life, and the high incidence of smallpox mentioned by Dr. Fishbein are but some of the evidences of failure on the part of the family physician to carry on in sufficient measure the practice of preventive medicine and the ideal functions of the family physician.

Dr. Fishbein speaks of the concern the family physician has for and the intimate touch he keeps with the lives of his patients and their families in matters both affecting health and disease. It would seem that a reasonable concern on his part and the exertion of sufficient influence would result in a greater utilization of this service by the laity and a greater participation on his part in the practice of preventive medicine. I know that in Boston we have made effort after effort to develop

and extend the practice of preventive medicine in the office of the general practitioner of medicine. I could offer much documentary proof in support of the energy expended by representatives of health departments in the United States in efforts to inform the layman of the value and significance of certain preventive measures and to encourage them to go to their own family physicians for the obtainment of the same. Unfortunately, the doctor has not been so coöperative and in many instances he has made very little effort to render these services to patients routed there.

I yield readily to the principle that the public health officer should without question refrain from depriving the family physician of the opportunity to render preventive service, and that it would be extremely unintelligent for health officers to set up the premise that it is better to examine children and others in large groups than individually by the family doctor. One can have very little respect for such judgment, yet I am sure that Dr. Fishbein agrees with me that the all important thing for the common good is to see to it that children do get examined, that they get immunized and vaccinated, in short, that everything possible be done for the upbuilding of their physical and mental health.

I sincerely feel that the *complete responsibility* for individual health cannot be delegated at this time entirely to the

* Discussion of paper by Morris Fishbein, M.D., entitled "The Physician and Public Health Officialdom," appearing in December issue of the *Journal*, p. 1223.

family physician. Dr. Fishbein has called our attention to the attitude of the family physician during the so-called golden years of 1928 and 1929, who was likely, when asked to do something in the way of preventive work, to say that his time was occupied fully with the care of the sick. Unfortunately this was not the answer given only in the years 1928 and 1929, but reflects the general reaction of the medical profession during the many years in which preventable diseases have been reduced, the infant mortality rate markedly lowered, the tuberculosis deaths cut almost in three. Any student of medical history must and will acknowledge gladly that the medical profession has of course played a most important part in this improvement. It must be remembered, however, that the ones responsible for this improvement have been the physicians of vision and judgment both in private practice and employed by health departments. Unfortunately the rank and file of the medical profession have lagged perceptibly behind.

I join gladly with Dr. Fishbein in paying well deserved tribute to those members of the medical profession who have done so much for the promotion of the public health, and I agree with him that there can be no question that the physician of the future must be a practitioner of preventive medicine. May I call attention to the fact that in a paper read by me ten years ago, entitled "The General Practitioner and the Practice of Preventive Medicine," I pointed out the advantages to the family physician in engaging in this essential service, as well as emphasized his ability to carry on this work.

I feel as Dr. Fishbein does about the obligation of health departments to carry on and further intelligent health education and subscribe to the theory that it is the job of the wide-awake health officer to get over to the public

certain health needs and values. The intelligent health officer will realize in its broadest sense the importance of enlisting the physicians in his community in the practice of preventive medicine, and he will see to it that the public is informed sufficiently about the relative advantage of going to their own doctors for this type of service. It is important for him to remember that more people will be reached and more preventive work done when more doctors of medicine will participate in this program.

Dr. Fishbein has painted a true picture of the health hazards influenced and increased by modern urban life. These have been in a marked measure the motivating influence for the increase of public health functions.

We have talked so far about the medical profession and public health officers. It would seem pertinent to say a word in consideration of the mass of people who are to be served, the so-called general public. Private practitioners of medicine, hospitals, and dispensaries have served and continue to serve the public in the field of curative medicine. While we must acknowledge the existence of the impostor who will go to a free dispensary or charitable hospital when he can well afford to pay, nevertheless, the income of the medical profession, insufficient though it may be in many instances, must and does come from that portion of the public who express a preference for the services of a private practitioner. It would seem reasonable to believe that the public will exercise the same discrimination and express the same preference in the preventive field. In the long run the public gets about what it wants and, whether we like it or not, the people will make their own choice. Many are going to want preventive service from their own practitioners of medicine when that body of men and women will be ready and willing to give

it to them. Some of the tax payers are going to want public bodies to give them preventive service, as they now get public education, police and fire protection.

I do not fear the bugaboo of state medicine but am rather optimistic about the practitioner of the future, to whom the principles of preventive medicine have been taught as part of his medical training, carrying out in practice the best principles of preventive medicine. The family unit, mindful of the fact that its physician is not only trained but willing to apply prophylactic measures, will come to him for it. On the other hand, there will always be here and there a group of people who will want free service, and another group who will in a measure argue that it is a public function and obligation to give it to them.

I cannot subscribe at this time to the complete abandonment by health officials of such services as prenatal care, well baby and preschool conferences, preventive inoculation clinics, tuberculosis preventive service, etc. It does not seem to me timely to refer all people in need of these prophylactic services to the offices of the private practitioner of medicine. I must prefer to endorse a program which has in mind the education of the community for better health, for the dissemination of advice to people, to seek these services from their own family doctor, and the maintenance of clinics for the indigent as well as for those who are not inclined at this time to accept private service. I cannot help thinking, too, that clinics maintained by health departments are valuable ocular educational demonstrations

of far-reaching beneficial effect, in the long run, to the medical profession. It may be wise to wait a while, watch further efforts like those of Dr. Vaughan in Detroit, and evaluate comparative results, in order to determine whether this or some other plan is the best way by which we may obtain the participation of the medical profession in public health programs.

May I mention Boston again in calling attention to the fact that while approximately 10,000 babies and preschool children out of a preschool population of over 75,000 are brought to the clinics of the health departments, the other 65,000 children are apparently receiving no prophylactic services. It would seem that ethical efforts could be exerted by the family physician, resulting in getting these children to their offices. We in the Health Department are constantly making efforts to get them there. We need the coöperation and willingness of the doctors of the city to obtain the necessary and needed results among this large group of our population—indeed a fertile field for the general practitioner.

It is admitted that the complete responsibility for the health program cannot be delegated to either the medical profession or the health officer. There appear to be both work and glory for both groups and it is the duty of those who speak for organized medicine as well as of those who speak for so-called official public health to harmoniously find the middle of the road, after which both groups should work shoulder to shoulder for common betterment and for the ultimate good of all.

EDITORIAL SECTION

Expressions of opinion and statements of supposed facts are published on authority of the writer under whose name they appear, and are not to be regarded as expressing the views of the American Public Health Association, unless such statements or opinions have been adopted by vote of the Association.

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MILK CONTROL AND PUBLIC HEALTH

UNDER the federal agricultural adjustment act, milk marketing agreements have been approved by the Secretary of Agriculture for most of the marketing areas of the country. An exception is the New York metropolitan area for which an agreement, proposed by the industry, now is under consideration [by the U. S. Department of Agriculture]. These marketing agreements, different for each area, provide, in general, prices to be paid to dairy farmers, selling prices to consumers, a production control plan, a code of fair practices, and for some areas a "pooling" of prices to producers whereby each producer gets a uniform price for his product except for butterfat and freight differentials. In each of these agreements the industry obligates itself to conform to all public health requirements governing milk sanitation in the area.

Over-production of milk and a reduced consumption had brought chaos into many milk markets through price cutting and panic prices to dairy farmers. Such conditions were of dubious benefit to the consumer. An uninterrupted supply of safe milk could not long be expected from producers on the verge of bankruptcy. The States of New York, New Jersey, and Connecticut preceded the federal government with state laws to regulate the milk industry essentially as a public utility and primarily for the benefit of dairy farmers.

There is no real surplus of milk production in the country if the nutritional needs of the population are considered instead of the present paralysis of buying power which has reduced by 25 per cent the milk consumption of some areas. Governmental control of milk production and prices is designed primarily as a first aid measure for a (stricken) sick industry. This control will fall short of its potential good to the public unless it is used aggressively to promote the sanitary quality of milk and its increased utilization.

The milk supply of most cities is not yet of a uniformly satisfactory sanitary quality. There are still many tuberculous cattle in dairy herds. The elimination of contagious abortion from herds has scarcely begun. If there are too many cows, eliminate those which are diseased; if there is a "surplus" of milk, exclude that which is unsafe.

Those concerned only with the economic aspect of milk control neglect the public health aspect. Health authorities thus far have had no voice in the milk marketing agreements. Here is an opportunity which yet can be seized to promote the sanitary quality of our most important single article of diet and our most prolific source of food-borne disease.

PUBLIC HEALTH AND THE PRICE OF MILK

THE price of market milk is a matter of great public interest, because pure milk is an indispensable food for all persons at all times. In periods of economic stress, quality milk is of even greater significance to the people, since it must be the basis of emergency nutrition and is the most essential dietary factor in the maintenance of health, especially of the children who are our future citizens.

Economic problems involved in the production and distribution of milk are as significant to the public health as are sanitary problems. Recognizing the fundamental principle that an adequate supply of clean and safe milk must be provided to all families at a reasonable price throughout the year, the federal government and several state governments have recently enacted legislation and created administrative boards to deal with milk control. These boards, upon which the state health departments are usually represented, have come into existence coincidentally with strikes and other disorders in the milk industry and have been endeavoring to stabilize prices and regulate production and distribution for the benefit of all concerned.

The cost of milk, like that of any other commodity, is governed by a number of factors, of which supply and demand is probably the most significant. The dairy industry has grown rapidly and extensively in this country in recent years. Between 1929 and 1933 there was, in fact, an increase of 14 per cent in the number of dairy cattle, or a rise from about 21,000,000 cows to about 24,000,000. In 1932 more than 100 billion pounds of milk were produced, of which 29 per cent was utilized for market milk, somewhat more for butter, and comparatively small percentages for cheese, ice cream, and the manufacture of such concentrated milks as evaporated, powdered, and condensed.

This expanding dairy industry ran full tilt into the depression. Consumption of milk and dairy products, never up to the optimum for the best interests of national health, has decreased. Despite the ardent efforts of physicians, health officers, welfare workers, nutritional authorities, and government officials to induce the public to consume more rather than less milk, there has been a decrease in fluid milk consumption during the last year of at least 5 per cent for the country as a whole, and as much as 15 or 20 per cent in some sections. Because of this greater national production and smaller consumption of milk, tremendous surpluses are now on hand in all parts of the country.

Sanitary measures, including inspection, testing, and laboratory control, have added greatly to the cost of milk, although all progressive dairymen agree with health officials that sanitary measures are not only necessary, but are a good

investment for all concerned. Milk sheds have been established in areas about metropolitan cities, with the result that certain producers have been excluded from these sheds because of failure to comply with requirements such as tuberculin testing, proper methods and conditions of production, and other desirable hygienic procedures. Many agricultural writers are convinced that the supervision of milk sheds has not been entirely free from politics and the baneful influences of political racketeering.

Two other factors have also entered into this complicated situation. One has been the organization of groups of producers into coöperative associations, which have been helpful in raising the quality of milk, although not always successful in keeping up the prices paid to the farmer. The second factor has been the creation of large corporations with national interests as distributors of milk and dairy products.

The large milk company doing a legitimate business offers certain advantages, not only to the farmer but to the public generally. Officials of these companies have always insisted upon, and have achieved rigid sanitary supervision. Because of their size, these companies have been able to pay bonuses to producers for the best milk, and also can provide adequate technical facilities for milk control. These concerns, with branches in many cities and interests in many products, can divert and utilize surpluses to advantage and thus maintain uniform distribution and prevent waste in spite of the tremendous fluctuations in demand due to sudden climatic changes and other exigencies.

One criticism of the big milk companies has been that they have "made too much money." There is much discussion of the apparent spread between the price paid to the farmer for his milk and the price paid by the consumer. Persons unfamiliar with the facts believe that most of this spread, ranging from 5 to about 7 cents, represents only profits to the distributor, not knowing that most of it goes into the necessary costs of sanitation and sanitary supervision, transportation, pasteurization, and delivery. The actual profit accruing to most of the large milk companies in prosperous times is less than three mills (\$0.003) per quart of milk sold and now is often much less than that. The amount that goes into administrative overhead is so small that if it were eliminated, the retail price of milk would be unaffected.

Pure milk is economical at its present prices of from 9 to 12 cents a quart in some sections, and 10 to 15 cents in others, for the best grades of pasteurized milk, and it would be economical as a food if the cost were even greater, though there is little likelihood of any considerable increase under prevailing conditions. Milk, appropriately known as our "most nearly perfect food," is nutritionally superior to any other single food and to many combinations of foods. There is no substitute for milk in the diet and there is no better return on the investment when at least one-fourth of the average family food budget is spent for milk and dairy products.

Health officials can contribute to the solution of the problems of the dairy industry, which are also directly the problems of public health, in enforcing at all times reasonable sanitary regulations for the production and distribution of milk, and by promoting a greater consumption of pure milk, either certified or pasteurized. Regulations should be uniform on a state-wide basis and should be shorn of unessentials. What is worth enforcing should be enforced, but in a rational manner, and with no tendency to lower the standards of quality milk in order to provide a cheap milk.

Public health will be improved whenever milk consumption is increased. The maxim of a quart of pure milk a day in some form for every growing child, for every nursing and expectant mother, and for every malnourished person, and at least a pint for every normal adult has a sound scientific basis. The health officer can perform no more important function than impressing these facts upon his constituents. It is his duty to take effective measures to guarantee clean and safe milk for the people and then see to it that they appreciate its acknowledged benefits in the field of human nutrition.

THE ASSOCIATION AND ITS SECTIONS

A FELLOW of the Association has asked what the parent body should expect of its sections, and what the sections should expect of the Association. An inquiry was sent out to the various section officers requesting replies to these two questions. The answers were somewhat discursive, but agreed on several points.

While a section should be well organized within itself, it should remember that it is one of the integral parts of the Association as a whole. Support of the parent body is its first duty. In performing this rôle it should be zealous in securing Association membership by adding to the number of its section members; it should prepare its own program for the Annual Meeting, having in mind not only the interest of the section itself but the educational contribution it can make to the entire Association along its lines of special interest; in its current activities it should consider primarily the development, standardization, and evaluation of procedures in its own field; but in this process it should continually study the interrelations of its own special work with that of the whole Association; on its own initiative or when requested, it should enter freely into collaboration with other sections in matters of mutual interest.

Finally, there is another activity which each section should take under serious and sympathetic consideration. This is the material support of the Association itself. Fixed revenue is painfully limited. Productive avenues of research and promotion stretch in many directions, but are fenced off by this limitation. Each section should feel a sense of responsibility for building up the resources of the Association through gifts and bequests from its own members or wealthy and influential friends whenever the occasion presents.

Turn now to the question as to what the sections have a right to expect from the Association. First they may expect and demand economical and efficient administration of the affairs of the Association. This is assured by an experienced staff at the central office who work devotedly for the welfare and strengthening of the organization on what are considered very slender salaries for the type of service required. But a still stronger assurance is guaranteed by the hours of devoted service to the affairs of the Association given from their crowded lives and with no remuneration by the officers and members of the Executive Board. If members of sections could appreciate what this involves in the way of individual sacrifice for the good of the Association it would serve as a powerful inspiration to their deeper interest in the society's progress.

Specifically the services which the organization can render its sections can be divided into those of general administration and those afforded by the five standing committees of the Association—Meetings and Publications, Fellowship

and Membership, Administrative Practice, Research and Standards, and Professional Education. General administration supplies the quarters, equipment, and business structure essential to practical operation. It aids in the proper assignment of activities and in the correlation of processes and results. Every effort is made to hold its cost within the minimum limit compatible with efficiency. The first two Association committees are primarily administrative, the one performing the vital functions of conducting the Annual Meeting and producing the *Journal* and other publications, the other an equally essential service in developing Fellowship and membership. Their activities are indispensable to the survival of the Association.

The three other committees are charged with the promotion of approved methods of public health administration, the study of existing practices, field service to health departments, research, the establishment of scientific standards of public health methods and procedure, and the promotion of adequate professional education. While the administrative functions of the central office act more or less automatically in their service to the whole Association, the scientific committees are equipped to render specific service to the various sections along the lines of their several activities.

In general, the sections may expect of the parent body:

1. Helpful coöperation, through its Standing Committees, in any matter in which the section requires assistance or collaboration from any other subdivision of the Association.
2. Sympathetic consideration of any appeal from a section for publicity or propaganda which it may require in connection with its policies or practices.
3. Allocation of funds in reasonable amount for specified activities which it desires to undertake, and for traveling expenses of its officers and committee members when special meetings are necessitated.
4. Provision of clerical and mechanical service to section committees when such service cannot conveniently be provided by the committees themselves.
5. Provision of opportunities for social and professional assembly at the Annual Meeting, consistent with the funds available.

Vastly more service could be rendered by the Association were more funds available. Every new membership or Fellowship secured by the sections has a double significance. It strengthens the Association but, of far more importance, it sets free just so much potential energy to be transformed into dynamic assistance to the sections by putting added resources at their disposal. The sections can serve their own interests in no way better than by putting forth their efforts to double their membership during the year 1934.

ASSOCIATION NEWS

S O S

AN OPPORTUNITY FOR YOU

THERE are 473 of our members and Fellows who have been unable to pay their 1933 A.P.H.A. dues. The rules and regulations necessitate these individuals being dropped from the Association unless dues are paid by them or by their friends. The number of these members and Fellows in each section is given below:

Health Officers Section.....	126
Laboratory Section.....	43
Vital Statistics Section.....	6
Public Health Engineering Section....	33
Food and Nutrition Section.....	22
Industrial Hygiene Section.....	16
Child Hygiene Section.....	40
Public Health Education Section.....	46
Public Health Nursing Section.....	68
Epidemiology Section.....	5
Unaffiliated	68

It has been suggested that the members and Fellows now having an income from positions which they continue to hold, come to the rescue of these less

fortunate colleagues, through the assumption of responsibility for such unpaid dues. This matter can be handled privately, without causing the slightest embarrassment to the member or Fellow who is now in arrears. Just send \$5.00 or \$10.00 to the Secretary of the Committee on Fellowship and Membership. Your contribution will then be used to cover the dues of a member or Fellow of your Section.

The responses to this suggestion, made first at the Indianapolis Annual Meeting, lead us to believe that the plan will be heartily welcomed by the membership.

Help save our members and Fellows from the embarrassment of losing their standing in their professional society, and help the Association. This is an S O S call to the loyal members of the Association, and has the approval of the Governing Council.

SUMMARY OF EXECUTIVE BOARD AND GOVERNING COUNCIL TRANSACTIONS AT INDIANAPOLIS

THE following summary of the more important actions taken by the Executive Board and the Governing Council in their official sessions at Indianapolis during the Annual Meeting are printed here for the information of the membership.

1. A committee was authorized to confer with the National Committee on Mental Hygiene, the American Psychiatric Association, and the American Neurological Association on the advantages or disadvantages of creating a Section on Mental Hygiene in the American Public Health Association.

2. The Executive Secretary was authorized to provide a place on the agenda of the first meeting of the Governing Council at the time

of the Annual Meeting for the presentation of questions and comments on Association policies by members of the Association.

3. Prof. C.-E. A. Winslow was reappointed chairman of the Committee on Administrative Practice.

4. Dr. C. C. Young was reappointed Chairman of the Committee on Meetings and Publications.

5. It was agreed to continue to agitate the matter of increasing the Endowment Fund and to make available to a list of influential people reprints of the Presidential Address of Dr. John A. Ferrell, including a form of bequest.

6. The plan of the Committee on Fellowship and Membership to retain unpaid members by appealing to members in good standing to assume responsibility for the dues of

at least one member in their section was approved. Already several of our members have taken this opportunity to assist some of their fellow members.

7. Sixty-two individuals were elected to Fellowship and 12 to Life Membership.

8. Reports of the four Association Committees, Committee on American Museum of Hygiene, Committee on Stabilization of Health Appropriations, Committee to Safeguard Public Health Consistent with Sound Government Economy, and Committee on Autopsies, were approved and will appear in the *Year Book*.

9. Resolutions on the following subjects were adopted. They will be printed in the *Year Book*.

Resolution of Appreciation to Dr. John A. Amyot

Resolution of Appreciation to the Local Committee

Resolution in Memoriam

American Legion Resolution

Revision of Food and Drugs Act

Federal Relief Administration Policy

United States Public Health Service

10. Pasadena was selected as the next Annual Meeting City.

11. Mr. H. A. Whittaker and Miss Katharine Tucker were elected to the Governing Council to fill unexpired terms.

12. An "Official Declaration of Attitude of the American Public Health Association on Desirable Standard Minimum Functions and Suitable Organization of Health Activities" was adopted. It will be published in full in the *Year Book*.

SECTION RESOLUTIONS

ADOPTED AT THE INDIANAPOLIS ANNUAL MEETING

Laboratory Section

DEATH OF DR. LEON C. HAVENS

WHEREAS, the Laboratory Section of the American Public Health Association has lost one of its most active members through the untimely death of Dr. Leon C. Havens, and

WHEREAS, the contributions of Dr. Havens to the advancement of public health laboratory procedures are outstanding, be it

RESOLVED, that the Laboratory Section express deep conviction that in the death of Dr. Havens, the Laboratory Section, as well as the whole Association, has suffered a great loss, and be it

RESOLVED, that this resolution be recorded in the minutes of the Section and that a copy be sent to his bereaved family.

keenly aware of the services rendered by Mr. Wachter during many years of devotion to the section's affairs, his dependability, his faithful attendance at meetings, his keen discussion of scientific matters with which he was concerned, and his work as a member of the Committee on Standard Methods from 1924 to the time of his death; be it

RESOLVED, that the Laboratory Section express its deep conviction that in the death of Mr. Wachter the Laboratory Section, as well as the whole Association, has suffered a great loss, and be it

RESOLVED, that this Resolution be recorded in the minutes of the Section and that a copy be sent to his bereaved family.

DEATH OF MR. LEONARD M. WACHTER

WHEREAS, the Laboratory Section of the American Public Health Association has lost a valued and active member through the death of Mr. Leonard M. Wachter, and

WHEREAS, the Laboratory Section is

DEATH OF PROFESSOR FREDERIC P. GORHAM

WHEREAS, the Laboratory Section of the American Public Health Association has lost through the death of Professor Frederic P. Gorham one of the pioneers in public health laboratory procedure, and

WHEREAS, the Section is keenly aware of its debt to Professor Gorham not only because of his own outstanding contributions but also because of his rare qualities of leadership and his ability as a teacher—his inspiration brought into the Section and into the Association some of its most useful members; he served as Section Chairman in 1912–1913, and subsequently was almost constantly a member of important committees—therefore, be it

RESOLVED, that while the Laboratory Section can no longer have the charm of Professor Gorham's actual presence, we feel that he has an immortality among us through "his boys" in public health work, and be it

RESOLVED, that this Resolution be recorded in the minutes of the Section and that a copy be sent to his bereaved family.

DEATH OF CLARENCE A. SHORE

WHEREAS, the Laboratory Section of the American Public Health Association has suffered an irreparable loss through the death of Dr. Clarence A. Shore, and

WHEREAS, the Laboratory Section is keenly aware of the faithful and dependable services of Dr. Shore, through his constant attendance at meetings, as Section Chairman in 1930 and 1931, and through his contributions to public health and laboratory procedures; be it

RESOLVED, that the Laboratory Section express deep conviction that in the death of Dr. Shore, the Laboratory Section, as well as the whole Association, has suffered a great loss, and be it

RESOLVED, that this resolution be recorded in the minutes of the Section and that a copy be sent to his bereaved family.

NEW MEMBERS

The following list includes applicants who have been approved for membership in the A.P.H.A. by the Sub-Committee on Eligibility. These new members have requested affiliation with the sections indicated, and action by the Section Councils will follow.

Health Officers Section

Harry C. Hummell, M.D., Health Bureau, 82 Chestnut St., Rochester, N. Y., Deputy Health Officer

Laboratory Section

Mildred A. Engelbrecht, M.S., 311 Agricultural Hall, Univ. of Wis., Madison, Wis., Instructor in Agricultural Bacteriology

Professor Alexander Klein, M.D., Dept. of Hygiene and Bacteriology, University of Groningen, Groningen, Holland (Associate)

Mary McCrath, c/o Ferris, 35 E. 17 St., Brooklyn, N. Y., Bacteriologist, Dept. of Health

Fred S. Paine, B.A., M.S., P. O. Box 916, Hilo, Hawaii, Bacteriologist, Bureau of Health

Lawrence Sophian, A.B., M.D., 428 West 59 St., New York, N. Y., (Associate)

Oscar Von Lange, Soledad, Calif., Dairy Technician

Vital Statistics Section

Elizabeth L. Brezee, A.B., 5126 Waterman Ave., St. Louis, Mo., Vital Statistician, St. Louis Department of Health

Public Health Engineering Section

DeWitt S. Abell, M.S., 321 Salisbury Rd., Statesville, N. C., Assistant Engineer, State Board of Health

Public Health Education Section

Harriet M. Gale, R.N., B.A., Grinnell College, Grinnell, Ia., Instructor of Hygiene

Grace D. Lucas, Jordan No. 193, Ann Arbor, Mich., Student (Associate)

Hubert O. Swartout, M.D., D.N.B., M.S., Box 2772, New Haven, Conn., Post graduate study, candidate for degree of Dr.P.H. at Yale University

Adele von Gruening, 919 N. 5th St., Sheboygan, Wis., County Nurse

Public Health Nursing Section

- Rosamond S. Hammer, A.B., 119 Elm. St., Branford, Conn., Chairman, Nurses Committee, Branford Visiting Nurse Association
- Ann M. Hellner, B.A., B.E., Saginaw General Hospital, Saginaw, Mich., Director, Visiting Nurse Association
- Hattie Hemschmeyer, R.N., 415 Central Park West, New York, N. Y., Executive Secretary, Lobenstine Midwifery Clinic, Inc., and of the Association for the Promotion and Standardization of Midwifery, Inc.
- Anna C. Potter, R.N., 1045 N. 5th Ave., Tucson, Ariz., Pima County Public Health Nurse

Epidemiology Section

- Harold D. Choate, M.D., M.P.H., A.B., Rm. 25, Municipal Courts Bldg., St. Louis, Mo., City Epidemiologist
- James W. Loughlin, M.D., Newcastle, Me., District Health Officer
- George E. Riley, M.D., C.P.H., B.S., State Board of Health, Jackson, Miss., Malaria-ologist, Bureau of Communicable Diseases

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PUBLIC HEALTH ADMINISTRATION

Amebic Dysentery in Chicago—On November 27 the Health Commissioner of Chicago reports that up to that date 348 cases of amebic dysentery have been reported in connection with the Chicago outbreak. The outbreak, which apparently made its appearance in August, has centered around certain hotels where it is reported that food handlers have been found either to be suffering from dysentery or are carriers. It is through this channel that visitors to Chicago have been exposed and there are now 112 cities involved in the outbreak. In addition to the 348 cases there have been reported 298 carriers and 24 deaths. The infection has been traced to almost every state, as well as to Canada and several foreign countries. The Chicago Health Department reports that "almost daily, we learn of cases of amebic dysentery that are diagnosed as appendicitis or ulcerative colitis and are undergoing operation. Unfortunately, when this occurs, the outcome is usually fatal. The correct diagnosis in many of these cases is made only after autopsy. Many cases of amebic dysentery are being treated as intestinal influenza, mucous colitis, appendicitis, or ulcerative colitis."

Because of the association of food handlers with the outbreak, the Health Department in Chicago has been enforcing very stringent regulations with regard to the sanitation of public eating places. Particular emphasis is placed upon the need of handwashing facilities for kitchen employees. In some hotels the employment of monitors is required, it being their obligation to see that after each chance contamination the food handler washes his

hands thoroughly with hot water and soap and that individual towels are used. Employees are also required to dip their hands in a chlorine solution and make use of a handbrush in removing unusual accumulations of dirt.

The regulations of the Chicago Health Department require that where food handlers are found to harbor the cysts of *ameba histolytica*, they should not be permitted to continue their usual occupation until adequate treatment and examinations have been completed. Carriers are treated either at home or at a hospital under conditions approved by the Health Department. Carriers who are non-food handlers are permitted to continue their usual occupation.—Herman N. Bundesen, *J.A.M.A.*, 101:1636 (Nov. 18), 1933, and special releases of the Department of Health.

Idleness and Health—A study is undertaken to answer two questions which are being asked on every side: Do families with most idleness show most sickness? Does employment status affect the nature or severity of illness reported? A careful analysis of the district chosen precedes the study. Nationality, type of occupation ordinarily pursued, age groups, housing, and sources of income were considered. Comparison is made between health conditions found in November, 1930, and April, 1932. It was shown that only 15 per cent of those included in the study as employable were working at the same job for the intervening period of 1½ years. In April, 1932, 38.7 per cent of the families contained sick persons as against 24.1 per cent in November, 1930.

There is much evidence that there

found sick in 1932 were receiving less medical attention than those found in the 1930 survey. Malnutrition heads the list in the prevalence of selected diseases in both surveys. Using the rate of bed patients per 1,000 persons in April, 1922, as 100, the corresponding rate for November, 1930, becomes 89.1 and for April, 1932, it is 128.3. The author presents factors which might have a distinct bearing upon the interpretation of the findings of the study, but with this consideration she concludes that "sickness is most frequently found in homes of idle persons who are normally at work."

Carefully prepared charts and tables make the study easy of comprehension. It is a distinct contribution to a subject which is causing great concern.—Gwendolyn Hughes Berry, Ph.D. *Idleness and the Health of the Neighborhood. A social study of the Mulberry District. Issued by the New York Association for Improving the Condition of the Poor.*

Zero Diphtheria Death Record in Bellevue-Yorkville for 1933—With not a single death from diphtheria during the period March 7, 1932, through November 28, 1933, in its area, the Bellevue-Yorkville District has surpassed its September 1, 1929, to February 28, 1931, low record in that respect. For the first 10 months of this year, there have been 71 deaths from diphtheria in the entire city, a new low record, with 16 in Manhattan and none in the Bellevue-Yorkville District since March 7, 1932, and through November 28 of this year. In the 10-month period of this year, there were 1,624 cases of diphtheria in the city, 545 in Manhattan and 53 in the Bellevue-Yorkville area.

For the first 10 months of 1933 the diphtheria case rate was 46 per 100,000 population in the Bellevue-Yorkville District, as compared with a case rate

of 252 per 100,000 population in 1928. In 1932 the case rate in this area was 58 per 100,000.

The success of anti-diphtheria work in Bellevue-Yorkville is shown by the fact that in 1928, the year before the Demonstration began its intensive anti-diphtheria campaign, there were 405 cases of diphtheria and 28 deaths from that cause. In 1929 the number of cases dropped to a total of 267 and the deaths to 9, while in 1930 the cases fell to 94 and the deaths to zero. The latter record stood until March, 1931, when diphtheria began to show a slight increase. In 1932 diphtheria cases in the area decreased to 83 and there were 3 deaths in January and February.

As compared with Manhattan and New York City, the records show that while Bellevue-Yorkville had a case rate decrease of 77 per cent during the period 1928–1932, Manhattan registered a decrease of 74 and New York City 69 per cent. The reduction of the death rate from diphtheria for the same period in Bellevue-Yorkville was 88 per cent, in Manhattan 80 per cent, and in New York City 70 per cent.

Southern Berkshire District, Mass.—The purpose and results of the public health developments of the past 2½ years in the Southern Berkshire District of Massachusetts, as outlined in a recent report, indicate the value of coöperative health work. This is a joint enterprise of a group of towns, the State Department of Health, and the Commonwealth Fund. "The State Commissioner of Health had for some years believed that if towns worked together, their citizens could secure as much protection against epidemics and as good health service generally as larger towns and cities already enjoyed." In 1931, a joint Committee of the Southern Berkshire Health District was formed by the boards of health of 16 towns, and this committee appointed

a medical director with authority to act as the agent of each board.

One of the first activities of the medical director was to persuade the boards of health which he represented to make uniform their regulations for quarantine and other communicable disease control. He also became a diagnostic consultant to physicians. The third step was to send a public health nurse, as a regular routine, to every home where a communicable disease occurred, to help the family guard against disease spread. Immunization against diphtheria was stimulated.

To aid in tuberculosis case finding, the health district arranged with authorities to bring a specialist from a state sanatorium to Great Barrington (the headquarters) once a month to examine persons—especially contacts—when the family physician wished assistance. Milk supervision has been coördinated, school nursing services have been strengthened, and in 13 towns, public health nursing is planned and administered as a unit.

In 1932, over one-third of the expectant mothers of the entire district were visited by nurses. A dental hygienist employed by the unit examined the teeth of children in all public schools twice a year, while a local dentist did the necessary fillings or extractions for children, in towns without dentists, at the expense of the town or of the parents. In 11 towns, "well-child conferences" are in operation.

Another contribution of the unit has been to bring leading specialists from Boston and elsewhere to lecture before the physicians of the district on subjects of particular importance to all general practitioners.

St. Marylebone, England—According to the interesting report for 1932, this borough of 1,427 acres with a population of 96,430, has 17,200 inhabited houses with 27,352 families. A birth

rate of 10.97, a death rate of 12.4 and an infant mortality rate of 87 are noted. A feature of the report is a series of tables showing the distribution and characteristics of the population in greater detail than is customary in American reports, but of much value to the administrator.

The main source of the notification of births was the hospitals, 83.6 per cent, with 11.9 per cent from midwives and 3.6 per cent from doctors. Failures to notify the department within 36 hours of birth, as required by law, were said to be comparatively few. The maternity and child welfare program is carried on by official and voluntary organizations, "the connecting link being the Public Health Department of the Council." Two hospitals provide lying-in accommodations, arrange for attention to be given to out-door patients, and conduct antenatal and infant consultations. There are 8 infant and child welfare centers and 4 antenatal clinics available. There is also a dental clinic for mothers and young children open 4 days a week.

Los Angeles County, Calif.—In the 1932-1933 annual report of the county health department laboratory, appear certain interesting deductions: there were 6,465 bacteriological tests made during the year per person, with 132 tests per 1,000 population. The gross salary cost per test was \$.29. The per capita salary cost for the bacteriological division, including chemists, was \$.05. This low cost is partly explained by salary reductions due to the depression and partly by decreased personnel. The total tests for the year of the county bureau of laboratories numbered 122,392.

A central laboratory supplies the 10 district laboratories with stains, reagents, special cultures, media, and assistance during heavy test periods. Fifteen bacteriologists in the division

hold state certificates indicating proficiency in various lines of laboratory work. Talks of both a popular and technical nature for various groups in the county have been frequently given upon request. These are sometimes followed by visits of the groups to the laboratory, or are accompanied by exhibits. These services, coupled with other public relations activities, are effectively described.

It is appropriate to note that this laboratory has developed practical designs of interest to directors, including structural incubator changes, a modification of the Quevenne lactometer, and a Stone Bacteria Colony Counter (described by Bausch & Lomb). Practical research work is undertaken along with routine activities as opportunity permits.

Minnesota.—The annual report of the Public Health Nursing Services in Minnesota under the Department of Health, and exclusive of the twin cities, is presented in graphic form with brief descriptive text. The scope of services rendered in 1932-1933 is compared with *Appraisal Form* standards of the American Public Health Association and with the records for 2 previous years. Besides this interesting information, there are included, all in 20 pages, Suggested Goals in School Health Work, and a directory of 27 advisory committees showing for each the county, the

board chairman, the number of members, and the sub-committees.

One striking result is the increase in visits made by nurses employed in counties and school services. The past 2 years of economic stress called for increased efforts by public health nurses to meet the demands of the communities in their struggles against malnutrition, communicable diseases, and social problems. Of 129,826 visits, 41 per cent were in behalf of school children, 19 per cent for communicable disease, and 19 per cent for non-communicable disease including orthopedic conditions, while the remainder were for adult supervision (7 per cent), maternity and new-born (5 per cent), infant and preschool hygiene (11 per cent). School nurses represent the largest proportion of specialized personnel; furthermore, county nursing services have been influenced by the facilities the school offers in reaching the population in large groups.

In connection with the school work, local doctors and dentists carried a good share of the responsibilities of the annual health examinations or inspections. Volunteer committees, arranged with medical groups for immunizations, vaccinations, skin tests and clinics. Wherever the doctors or dentists made examinations, plans were arranged by the local medical and dental groups with the school board, the nursing committee and the nurse.

LABORATORY

A RAPID AND ACCURATE SEMI-AUTOMATIC DELIVERY PIPETTE

M. W. JENNISON, PH.D.

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Technology, Cambridge, Mass.*

THE bacteriologist often has need of an accurate but rapid method for making dilution blanks, measuring exact quantities of broth, agar, etc. The apparatus* described here was designed for such purposes, and may be adapted to various problems.

The apparatus (Figure I) is essentially a double form of the so-called "automatic overflow pipette," the fluid to be distributed being siphoned from a reservoir above the pipette. With each half turn of the stopcock, one pipette fills while the other is emptying. By making the bores of the stopcock and connecting tubes large, filling and emptying is accomplished in 2 or 3 seconds, allowing the operator to fill perhaps a thousand tubes an hour. Speed is not sacrificed to accuracy, since the precision of delivery is ± 0.1 ml. The larger bore also simplifies cleaning.

The particular pipette illustrated here was made to deliver 9.2 ml., so that after sterilization the tubes contain 9.0 ml. The apparatus may, of course, be made and calibrated to deliver any volume desired. Furthermore, in order that this pipette might be sterilized—to measure out sterile media—it was constructed of Pyrex glass and annealed. Such construction makes for a much less fragile piece of

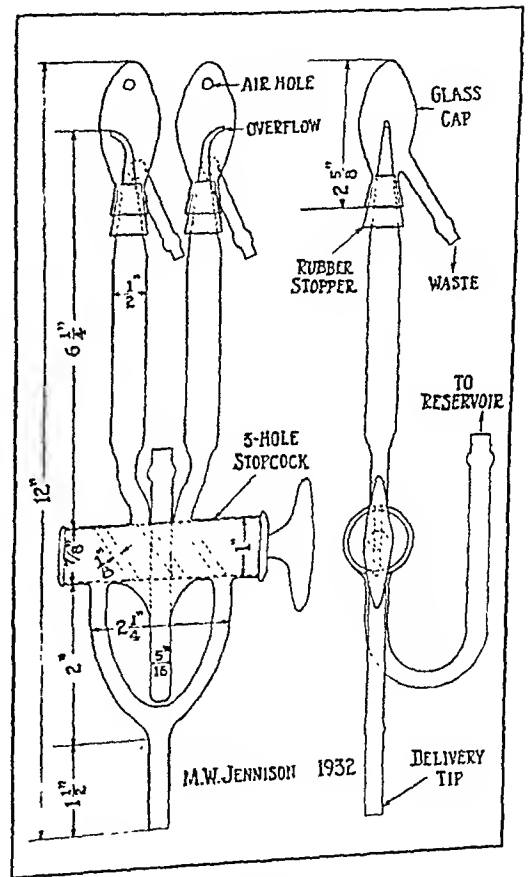


FIGURE I

glassware, even if its sterilization is not contemplated. For delivery of sterile media, a glass or metal¹ bell-shaped cap is placed on the delivery tip.

REFERENCE

1. Mallmann, W. L. A device for aseptic distribution of culture media. *A.J.P.H.* 21, 3:288 (Mar.), 1931.

* Made to specifications by Macalaster Bicknell Co., Cambridge, Mass.

STANDARDS

ANNA W. WILLIAMS, M.D., F.A.P.H.A.

Bureau of Laboratories, New York City Health Department, New York, N. Y.

IF a single word were chosen to describe one of the most important interests of the Laboratory Section of the American Public Health Association, that word might be *Standards*.

From the beginning of its organization this section has encouraged study, criticism, testing, and helping to establish laboratory standards of public health measures; then it has advised the re-study, re-criticism, re-testing, modifications—destruction even, if deemed necessary—of the accepted standards; and has recommended the altered or new ones to the Association, later through its general Committee on Research and Standards.

We have always recognized the danger of accepting standards as final—of sitting back in our chairs and allowing our laboratory work to be run without comment, according to routine cut-and-dried standard methods even of those that seem most firmly established. We realize that while standards are necessary for good comparative work, there must be “continuous reconstruction” of methods in accordance with growing knowledge; and that this means concerted effort to oversee and evaluate the laboratory work being done throughout the world.

In his talk on “Activities and Trends in the Laboratory Field” at the “Ten Star Final” session of our Washington annual meeting, Dr. McCoy’s subtle observations concerning the widespread view of the instability of standards may well be remembered. He said, among

other things, “just now seems to be a time of more than ordinary questioning of all views and of what were thought to be well established facts.” Again, he said, “One of the outstanding facts that has impressed me in recent years has been the rich harvest to be garnered from the re-working of old fields.”

As we glance over the reports published by members of this section during the past year we are impressed by the fact that several methods in laboratory procedure along both medical and sanitary lines have been criticised, some new ones have been advised, and a few have been considered outworn. For example: Criticisms have been made and changes have been suggested in the methods of milk examination, including examination for milk-borne diseases; in the methods of the disinfection of foodstuffs and eating utensils; in the methods of the examination of various waters, including swimming pools; in the methods of the preparation and dosage of toxoid, of typhoid vaccine, of rabies vaccine, of BCG vaccine; in the methods of preparing and tests for potency of meningococcus serum and hemolytic streptococcus serum. The big problem of the present value of cultures in the diagnosis of diphtheria has been discussed and evidence has been presented in favor of the discontinuance of the method because no longer necessary in the face of the proved worth of diphtheria vaccination and the practicability of its application.

The new methods recommended for consideration are taken up in our Standard Methods report.

The question has been under consideration as to whether our section is

* Presented to the Laboratory Section of the American Public Health Association at the Sixty-second Annual Meeting in Indianapolis, Ind., October 9, 1933.

handling in the best manner possible all the investigations concerning laboratory standards in public health. Is our Committee on Standard Methods organized in such a way as to receive full value from advancing knowledge, to be able to report reasonably quickly and authoritatively on recommended changes, and to be constantly on the alert for worth while ideas?

Some have thought the present committee too large, others have thought it not large enough to handle all phases of laboratory methods, and several other criticisms have been made—hence a reorganization is being considered.

There is no question but that our Standard Methods committee has done very efficient work in the past, and there is no question in the minds of the majority but that such a committee—in modified form, perhaps—should be continued. The claim that the general Committee on Research and Standards is taking over the work of our committee is based on a mistaken idea of the duties of our committee and of the general committee, as well as of the organization of the Association as a whole.

From the standpoint of organization the functions of a general Committee on Research and Standards must necessarily be: first, general oversight and final approval of investigations on standards carried on by each and every section; second, the development of research involving more than one section; and third, the carrying out of executive measures common to more than one section.

Such a general committee is particularly necessary where there is overlapping of interests as there so often is between many of the sections. We all are aware of the close relationship between the work of the Laboratory Section and that of the Epidemiology, Public Health Engineering, Health Officers, Industrial Hygiene, Food and

Nutrition, and Child Hygiene Sections. The question of undue overlapping—of duplication of work—makes coöperation imperative. It would seem to be peculiarly the function of the general Committee on Research and Standards to organize investigations that involve intimately more than one section, such as the investigations this committee has just planned concerning the most efficient methods of making and administering typhoid vaccine. These investigations belong obviously to the Epidemiology and Health Officers Sections as well as to the Laboratory Section; and so it might logically be engineered—as it is—by the general committee, dividing up the work among these three sections and appropriate sub-committees of the general committee.

There are enough complex investigations in public health that should be undertaken to keep all sections and general committees busy without taking away from any section the work that legitimately belongs to it.

It goes without the need for emphasis that in all public health work involving laboratory problems in standardization, the Laboratory Section should be and wishes to be active in doing its part to help establish laboratory standards in both medicine and sanitation. These activities are so closely related that their separation is more or less artificial and a matter of convenience. Take for example the problem of swimming pool purification. This includes the types, construction, and cross-connections of the pools, the different dangerous disease germs these waters may contain, and the effect of disinfectants on the germs and on the swimmers. You realize at a glance how wide are the relationships.

If any section has not been as active as usual during the past four years in carrying on research and helping to establish standards in public health

work, at least a partial explanation may be given by quoting a line from this year's general report of the Executive Board to the Governing Council, "The necessity for economy has forced the Association to limit its activities to practically the bare essentials of existence."

No committee was able to meet sufficiently often—most of them not more than once in the year. At present, therefore, our criticisms of activities

must be tempered with the knowledge of these adverse times. The investigations of most problems require extra funds which are not included in our diminishing budgets, hence most of us are under the necessity of continuing to look forward into the future for the carrying out of some of our plans. Many plans, however, we are attempting to carry on, and we can report progress and hope for a reasonably speedy fulfillment of them.

VITAL STATISTICS

Vital Statistics for Montreal, Canada, 1922–1932—Analysis of the statistics for the city of Montreal, revised on the basis of the recent census, brings to light some interesting facts concerning vital statistics for the period 1922–1932.

In accordance with the general trend in Canada, the marriage rate in Montreal declined, in 1932, to 6.93 (per 1,000 population) from the figure of 7.57 recorded in the previous year. Comparison of the 1932 marriage rate with that registered in 1922 (8.77), shows a much greater reduction. As an outgrowth of the marriage trend, the birth rate in Montreal also has dropped; in 1932, 1931, and 1922, birth rates of 24.01, 26.59, and 32.50 (per 1,000 population) respectively, were recorded. The period 1922–1932 saw a 26 per cent decline in natality—an even larger decrease than in the marriage rate.

The fall in the proportions of births and marriages is counterbalanced somewhat, however, by the decline in infant mortality to 98.9 deaths (per 1,000 live births) in 1932—a rate much more favorable than that (159.4) shown in 1922. Comparison of the two figures reveals a 38 per cent drop in

the period 1922–1932. Examination of available data also shows that the 1932 infant death rate in Montreal (98.9) is in about the same range as the corresponding figure for the Province of Quebec (94.2). Yet, when the 1932 infant mortality (73.2) for the entire registration area of Canada is brought into the picture, the rate for the City of Montreal does not appear so gratifying.

In 1932, the City of Montreal experienced a general mortality of 11.68 (per 1,000 population)—a rate only slightly lower than that recorded in 1931 (12.08), but 25 per cent lower than the figure of 15.60 registered in 1922. It is interesting to note that the declines in the general death rate (25 per cent) and in the birth rate (26 per cent) were about equal during the period 1922–1932.

Further analysis of the mortality data for the years 1922 and 1932 shows increases in the death rates from cancer (29 per cent); Bright's disease (19 per cent); and organic heart diseases (32 per cent). In contrast, however, the death rate from pneumonia (all forms), declined 44 per cent during the period 1922 to 1932.

Tuberculosis (all forms) also declined 32 per cent in its mortality in the same period. This cause resulted in 100 deaths (per 100,000 population), in Montreal in 1932; in the same year the Province of Quebec registered a corresponding rate of 103. However, as in the case of infant mortality, the tuberculosis death rate in the City of Montreal appears quite high when contrasted with the death rate of 68 from tuberculosis in the registration area of Canada.—*Report of the Dept. of Health, Montreal, P. Q., Canada. Preliminary Report Vital Statistics of Canada.*

Dangers of Early Infancy—The infant death rate has declined enormously during the last decade in Illinois but there has been no improvement whatever in the chance of survival for the baby who fails to live out the first day of life. The threshold of earthly existence is equally as dangerous as ever and the fatal risks of the first day are greater in magnitude than those of any subsequent day on earth for human creatures in general.

Mortality of infants during the first day of life is four times greater than during the second and eight times greater than during the third day of life. In other words, the baby who lives through the first 24 hours has increased fourfold his chances of survival while the one who lives for 48 hours has an eightfold better chance of surviving to adulthood than at the moment of birth.

These interesting facts are revealed by an analysis of infant mortality statistics of Illinois for the 15 years ended with 1932. For babies under 1 day old the losses in 1918 were 16.4 per 1,000 live births reported and in 1932 the rate was 15.5. During the intervening years the rate fluctuated between the narrow margin of 14.8 and 16.4. This is the only age group of infants that experienced no improve-

ment whatever with respect to survival.

For babies included in the 1- to 7-day age group the losses in 1932 were nearly one-third less, in proportion to births, than they were in 1918. Even so, the rate of improvement was much less than for older infants. The death rate per 1,000 births for the 1- to 7-day old group fell from 15.6 in 1918 to 10.6 in 1932 and the decline in rate was constant during the period.

The death rate in 1932 for infants in the 1-week to 2-months age group was just about one-half what it was in 1918. The decline was from 21.1 to 10.6 deaths per 1,000 live births reported. Here again the decline was steadily downward year by year.

Even more striking has been the improvement among older infants. Losses in 1932 among babies between 2 and 12 months old were only one-third of those in 1918. The death rate in this group fell from 48.7 to 16.0 per 1,000 births.

These records indicate that the improvement in infant care has been remarkably effective in saving life after the first few days but that nothing has been accomplished in making safer the first day of life on earth. This fact suggests that prenatal influences dominate the chances of survival of babies during the first 24 hours, while things that can be done for the baby itself become more and more important with each hour of life.

The infant hygiene measures which have been applied with such striking success relate chiefly to diet and feeding on the one hand and to the sanitation of milk supplies on the other hand. Manifestly these measures can do practically nothing for the infant under 24 hours of age. Something more fundamental and something that reaches back into the prenatal existence of babies must be done in order to cut down the losses on the natal day of existence.—*Illinois Health Messenger*, 5:85-86 (Nov. 15), 1933.

PUBLIC HEALTH ENGINEERING

MOSQUITOES HAVE NO PLACE IN THE CITY*

R. E. TARBETT

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URBAN mosquito control combines two types of activity: the control over production of "wild" mosquitoes of various species breeding in natural water collections in undeveloped areas within and adjacent to the built-up section; and control over production of the "domestic" and pestiferous species, breeding in the innumerable small permanent and temporary collections of water whose origin is due to the development of the city and to the habits and characteristics of the population.

In general, the problem in any large urban community is one of pest control, although control of production of malaria carrying mosquitoes may be necessary in the outlying sections, and in the South control over production of *Aedes aegypti*. In the case of *A. aegypti* it is both a public health and a pest or nuisance problem.

The development of urban areas tends to build out the mosquito life originally there, but at the same time builds in the domestic types of mosquitoes.

The mosquitoes which constitute the greatest nuisance in our urban areas are certain species of the *Culex* group, commonly known as domestic or house mosquitoes and, in the South, the most domestic of all, the *Aedes aegypti*. The

Culex group will breed in any and all collections of water suitably protected, but appear to prefer a filthy water. The *A. aegypti* will breed only in man-made containers in and around inhabited dwellings.

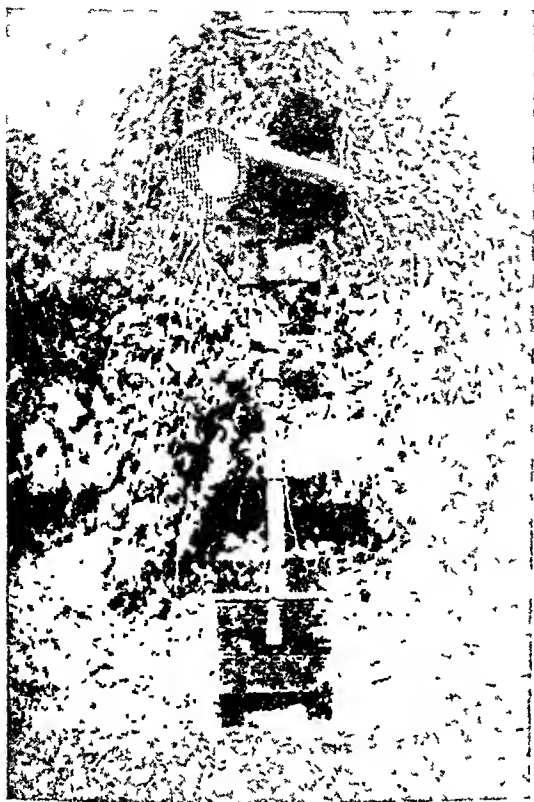
The number of small active foci of mosquito production, all man-made, that exist in an urban area is almost unbelievable. Some of these may be of a permanent character but many are temporary and are constantly changing. Some of these are street corner catch basins, particularly those that are trapped; areaway catch basins and traps including garage traps; temporary or semi-permanent collections of water due to obstruction of natural water courses, and the various and sundry receptacles and things that will hold small quantities of water for a period of 7 to 10 days.

Location near extensive salt marsh areas may complicate the problem, since these areas may permit production in large numbers of the very troublesome, long flight species of mosquitoes.

In the control of mosquito production in natural water areas we have to deal only with the mosquito and the breeding places. In urban control, however, we have added the human factor which greatly complicates the problem. Because of this the inspection service is one of the most important parts of the control activity.

Cost of mosquito control in large

* Read before the Public Health Engineering Section of the American Public Health Association at the Sixty-second Annual Meeting in Indianapolis, Ind., October 10, 1935.



Gas killing mosquito trap—operated automatically by clock attachment on storage battery current

urban areas is not relatively expensive, and the relief from mosquito nuisance generally warrants the expense.

Unit costs will vary depending upon the location and character of the city as well as the extent of the area within which control activity must be maintained. In general, the cost for the first year of control should not exceed \$.10 per capita, or \$600 to \$650 per square mile, for a city of 500,000 population. This should decrease somewhat with larger cities and increase with smaller ones. After the first year the cost should drop to about \$.06 per capita, or \$400 to \$450 per square mile of urban area, for the 500,000 population city, varying as before with the increase or decrease from that figure.

Where large swampy areas or salt marsh areas adjoin the city, the first cost of control would be considerably increased, but it would not be recom-

mended that all necessary drainage be attempted the first year.

It is not possible to go into the details and complications of urban control. Two things are important. Within the city proper constant and proper inspection of all properties, public as well as private, must be maintained if the ever changing sources of production are to be controlled. Exact knowledge as to the species of mosquitoes found in the area, as well as their characteristics in that particular area, must be had, and the density of species checked regularly in all sections of the area. With this information it is possible so to plan the work as to bring about a reduced production sufficient to maintain prevalence below the nuisance point.

In urban control there is perhaps more opportunity for development of methods and equipment than in the case of control in rural areas. Many things may affect the movement of

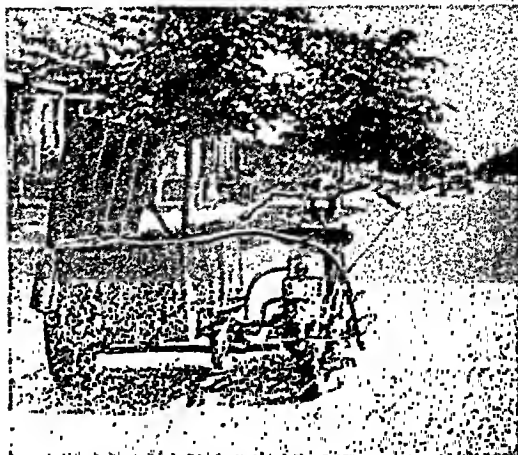


Glass killing mosquito trap

mosquitoes within urban areas that do not exist in rural areas. Air currents are different; light attraction exists; certain areas have an abundance of harborage while others have an excess of moisture. With a combination of some of these conditions we may find an excess prevalence in areas considerably removed from breeding areas.

In determining the relative prevalence of mosquitoes as well as the species present in any section, the mosquito trap developed at the New Jersey Agricultural Experiment Station is of considerable assistance. This trap does not depend upon the human equation which must enter into all hand catching methods. It is automatically controlled by a time-clock so that it may be in operation during any definite period of time. It has been found that mosquitoes not ordinarily obtained by hand catching are collected in this trap. We furthermore know that when mosquitoes collected by the trap during the dusk and dawn periods, say from 6 to 9 in the evening and 4 to 6 in the morning, exceed 24, a nuisance exists. By proper use of these traps it is

possible constantly to maintain definite knowledge as to mosquito prevalence as well as species, and to direct the work in those sections where excess prevalence exists.



Motorcycle catch-basin spraying unit

At times there are indications that flights of mosquitoes are taking place into certain definite areas, and where this occurs a flight detector may be of considerable value in determining from what direction this flight is coming. With the direction established it is not difficult generally to locate the source.



Boat spraying unit in operation

In the general control over many breeding places within the city which cannot be done away with, we have not been able to improve upon oil as a larvicide. The application of this oil, and usually it must be applied at approximately 7-day intervals, offers opportunity for development of methods and equipment which will bring the cost to a minimum. An example of this is perhaps in the catch basin control in the City of Washington. Over 10,000 trapped catch basins exist in which water is maintained at all times. In these catch basins we have found that *Culex* mosquitoes will breed in enormous quantities. Motorcycle equipment has been developed for carrying on this work. With this equipment it has been possible for one man to care for about 450 catch basins per day at a cost of approximately \$.015 per catch basin oiling. Attempts have been made to develop other methods of control which would further reduce the cost. On the basis of \$.40 to \$.45 per season, however, it has thus far been difficult to lower the expense.

Another problem which was encountered in Washington and which might be encountered in other cities, particularly those located on navigable

waters, is the hydraulic filling of marsh areas. In the filling operation, constantly changing water areas are created and generally the filled area is so soft that men cannot enter upon it. These areas may be controlled with the minimum amount of expense through spraying a water and oil mixture by means of a force pump installed in a bateau. With this apparatus it is possible to throw a stream of water mixed with oil a distance of 60 ft. from the end of a 500 ft. hose.

These two methods of applying oil in specific cases are given as illustrations of what may be developed to take care economically of certain breeding areas, which may be peculiar to any area.

Mosquito nuisance in a large urban area is due principally to causes brought about through the development of the city, and to the character of the city, and have little connection with conditions existent prior to development. Since conditions permitting the nuisance are man-made, the control should be considered as much a part of municipal activities as is garbage collection, for instance. Since mosquito nuisance is no more excusable than other nuisances, there should be no reason for permitting its existence.

INDUSTRIAL HYGIENE

The Influence of Atmospheric Ionization Upon the Human Organism—The physiologic effect of the ionic content of the air on the normal human organism was investigated in this study. Observations made on five normal subjects once a week over a period of 1 year showed no significant changes in the metabolic rate, blood pressure, pulse rate, respiration, oral, skin and body temperature, although under certain conditions, changes in at-

mospheric ionization appeared to be associated with minor physiologic changes.

Breathing artificially de-ionized air for a period of 1 hour has no apparent effect on a subject under basal conditions.—A. D. Brandt. *J. Indust. Hyg.* 15, 5:354-361 (Sept.), 1933. L. G.

The Effect of Clothing on the Rate of Cooling of the Body—This is a theoretical discussion of the effect

of clothing on the rate of cooling of the body. The naked and clothed body in still and moving air is considered, and formulae for the rate of cooling are developed in each case.

Analyses of the derived expressions show the following: A given air motion cannot cause as large a percentage increase in cooling on the clothed body as on the naked body; a greater increase in the cooling rate may be had by the removal of clothing than by an increase in air velocity when the over-all conduction of the clothing is less than the air flow coefficient for still air; and the rate of cooling of either a clothed or naked body, under constant conditions regarding clothing and air motion, is proportional to the difference between the skin temperature and the dry bulb temperature of the air.—Walter S. Weeks. *J. Indust. Hyg.* 15, 5:383-386 (Sept.), 1933. L. G.

Measurement of the Flow of Air Through Registers and Grilles—This study develops a method of measurement of air flow by the use of the anemometer which is applicable to field tests where a precision of 5 per cent may be considered reasonable. Several types of grille are considered in the investigation. Pitot tube traverses were taken as a basis of comparison of the method used.

The formula $V = \frac{C_r \cdot v(A+a)}{Z}$ (Where

V = volume of air in cu. ft. per minute; C_r = velocity coefficient varying between 0.952 at 150 ft. per minute to 1.000 at velocity of 800 ft. per minute, v = average indicated velocity in ft. per minute obtained by anemometer traverse, A = gross area or grille in sq. ft.; a = net free area in sq. ft.) was found to be applicable under normal conditions and procedure for supply grilles, but a second coefficient was necessary when the frets of the grilles were large. The value of the fret

coefficient, C_r , varies between 0.65 to 1.00 and is a function of the percentage of free area, size of fret and size of anemometer used.

The four methods of making an anemometer traverse, namely, (1) spot traverse—stationary reading; (2) over-all moving traverse; (3) spot traverse—moving reading; and (4) strip traverse, are discussed. With proper care all the methods gave substantially the same results.

The effect of approach on the character of the air stream is considered. Narrow strips of dead space may usually be ignored without appreciable error in the results but it is recommended that the quiescent area be omitted in the calculations of air flow.

Difficulty was encountered in velocity measurements of unit ventilators due to poor air distribution. A new method of measurement was therefore devised using a sheet-metal cone-cylinder attachment on the anemometers so as to obtain a uniform velocity against the whole area of the anemometer. This device is also applicable to the measurement of air flow in grilles of a highly ornamental pattern where it is difficult to measure accurately the free area of the outlet.

The disadvantage of this instrument is that it is sensitive to variations in the angle of flow. It is believed that the accuracy of the device may be increased by further developments.—L. E. Davies. *Heating, Piping and Air Conditioning*, 5, 9:486-495 (Sept.), 1933. L. G.

Radiation of Energy Through Glass—This is a study of low temperature radiation through glass. The absorbing qualities of various kinds of glass was determined with the pyroheliometer. Several radiant energy sources such as a radiant heater, an electric arc and banks of incandescent tungsten and carbon filament bulbs were used.

The results of the investigation showed that glass does not transmit low temperature radiation. Ordinary double strength window glass transmits no measurable amount of energy radiated from a source at 500° F., or lower. Only 6.0 and 12.3 per cent of the total radiation is transmitted from surfaces of 700° F. and 1,000° F. respectively. The same glass, however, transmits 76.3 per cent of the radiation from an incandescent tungsten lamp, 65.7 per cent of the radiation from an arc lamp and 88.9 per cent of the radiation from the sun. Glass windows may therefore constitute heat traps since they allow a relatively free transmission of radiant energy into the room from the sun to warm the objects in it, but do not allow these objects to lose this heat by re-radiation through the windows.—J. E. Blackshaw and F. C. Houghten. *Heating, Piping and Air Conditioning*, 5, 10:523-525 (Oct.), 1933.

L. G.

On the Normal Absorption and Excretion of Lead. I. Lead Absorption and Excretion in Primitive Life—The presence of "normal" lead in human tissues has been a subject of controversy since 1838, but with improved methods for the estimation of lead it is now apparent that lead occurs regularly in the feces and in the urine, as well as in the tissues of normal, healthy persons. It was generally believed that the presence of lead in the normal body arose from contact with lead-containing commodities of modern life. Observations were therefore made in two communities in Mexico to test this hypothesis. The two chosen communities prescribed no opportunities for artificial lead exposure and represented conditions of primitive life. The only metal implements used consisted of sickles and machetes.

Blood, feces, and urine samples were taken from each of the 95 subjects se-

lected for study. Beverages and food, as well as soil samples from the pueblos, were also analyzed. The results showed that the soil samples from various parts of the fields under cultivation yielded lead in concentrations between 0.60 to 6.00 mg. per kg.; water contained minute traces of lead; vegetation disclosed small amounts ranging from 0.03 to 0.94 mg. per kg.; lead in animal products and prepared food materials varied between 0.02 to 4.15 mg. per kg. The lead-glazed character of the pottery used may possibly account for the high concentration of lead in the prepared food. Urine analyses showed the mean concentration of lead to be 0.0138 mg. per liter of urine. The mean concentration of lead in the feces was 0.1078 mg. per sample of feces or 0.0347 mg. per gm. of ash. Blood analyses showed small amounts of lead. Sixty-five per cent of the blood samples were negative for lead content while 35 per cent showed concentrations from 0.01 to 0.06 mg. of lead per 100 gm. of blood.

A detailed description of the analytical methods used in the analysis of urine, feces, food, tissue and other materials is given.—Robert A. Kehoe, Frederick Thamann, and Jacob Cholak. *J. Indust. Hyg.* XV, 5:257-271 (Sept.), 1933.

L. G.

On the Normal Absorption and Excretion of Lead. II. Lead Absorption and Lead Excretion in Modern American Life—This is a study of the lead intake and output of human subjects under normal environmental conditions. The results showed that the lead intake in the food of the selected subjects was approximately equivalent to the lead content of their feces and varied between 0.16 mg. to 0.28 mg. of lead per day; that the normal American adult excreted lead at a rate of from 0.02 to 0.08 mg. per liter of urine, and from 0.03 to 0.1 mg.

per gm. of ash in the feces; that the greater part of the lead administered orally was eliminated unabsorbed and that such amounts of lead which were absorbed produced an increase in the rate of urinary excretion during the period of active absorption and for a time thereafter.

Lead determination of the various tissues of the human body was also made. In the case of a normal child the greatest concentration of lead (1.142 and 1.022 of lead per 100 gm.) was found in the long and flat bone. The average lead concentration was 0.309 mg. per 100 gm. of tissue. The analysis of the tissues of a normal adult showed the greatest concentration (1.11 mg. of lead per 100 gm.) in the flat bone and an average lead concentration of 0.17 mg. per 100 gm. of tissue.—Robert Kehoe, Frederick Thammann, and Jacob Cholak. *J. Indust. Hyg.* 15, 5:273-288 (Sept.), 1933.

L. G.

On the Normal Absorption and Excretion of Lead. III. The Sources of Normal Lead Absorption—Previous studies have shown that the presence of lead in food materials was the major factor in the lead absorption and lead excretion of normal persons. Certain common foods and beverages were therefore analyzed for lead content. It was found that food which was largely of natural origin contained insignificant amounts of lead (0.00 to 0.11 mg. of lead per kg.) while the staple articles furnished large amounts of lead. It was found that fruits which were analyzed without removing the peel showed a high concentration of lead, the source obviously being from the wide use of lead compounds as insecticides.

On the basis of the amount of material consumed by an individual per week, meat and bread furnished one-fourth to one-third of the average

amount of lead ingested weekly. When milk occupied a prominent position in the dietary it was found that it contributed a large proportion of lead. The concentration of lead in milk, however, did at no time exceed 0.04 mg. per liter.

Beverages, other than water, showed significant concentrations of lead. Synthetic lemonade, carbonated drinks, grape juice, and alcoholic beverages showed the presence of varying amounts of lead which were due to some form of contamination and not to the lead content of the beverage, *per se*.

An excellent bibliography on the sources of lead is presented.—Robert Kehoe, Frederick Thammann, and Jacob Cholak. *J. Indust. Hyg.* 15, 5:290-300 (Sept.), 1933.

L. G.

On the Normal Absorption and Excretion of Lead. IV. Lead Absorption and Excretion in Infants and Children—In order to determine whether limited length and variety of experience was associated with a corresponding limitation of lead absorption and excretion, studies were made on a group of infants and children. A group of American children with no lead exposure showed a much higher concentration of lead in the urine and feces than a group of Mexican children living under essentially primitive conditions. The American group showed concentrations varying from 0.02 to 0.18 mg. per liter of urine, with a mean excretion of 0.08 mg. per liter, as compared with the Mexican group which varied from nil to 0.03 mg. per liter; with a mean of 0.015 mg. per liter. The mean lead excretion in the feces of the American group was twice that of the Mexicans, with 0.08 mg. per gm. of ash. No correlation was found between lead excretion and age.

Analyses of human milk from normal mothers with negative histories of occupational lead exposure showed that

ingestion of human milk is one source of lead intake. Amounts varying from 1.0 to 0.05 mg. per liter were found.

In order to test the possibility of the presence of lead in infants being due to lead absorption in utero, the tissues of premature and stillborn fetuses were analyzed for lead content. Varying amounts of lead were found in the various tissues but the amounts found were too small to account for a rate of lead excretion such as that observed in infants and children.—Robert A. Kehoe, Frederick Thamann and Jacob Cholak. *J. Indust. Hyg.* 15, 5:301–305 (Sept.), 1933. L. G.

Lead Absorption in Relation to the Diagnosis of Lead Poisoning—In recent years the presence of lead in the feces and urine of suspected cases of lead poisoning has been used as one of the criteria of lead exposure. The assumption was that an exposure to lead resulted in lead absorption and produced an elevated rate of lead excretion for some time after exposure had ceased. The lead excretion of subjects after cessation of lead exposure was therefore followed to determine the validity of such an assumption.

In the present study it was found that after cessation of lead exposure, lead is excreted at a higher rate than normal when abnormal amounts of lead are absorbed. The period of increased lead excretion depends upon the extent of lead absorption; the rate of lead output diminishes rapidly for a period of several weeks after which there is a prolonged and gradual diminution in the excretory rate until the normal level is reached. Following an abnormal lead exposure unusual amounts of lead were found in the blood during life and in the tissues at necropsy for variable periods of time after cessation of exposure.

The detection of abnormally high rates of lead excretion is a very valu-

able aid in determining the severity of lead exposure, but it does not constitute a diagnosis of lead intoxication. Skill and judgment in the interpretation of clinical evidence is still the basis of the diagnosis.—Robert A. Kehoe, Frederick Thamann and Jacob Cholak.—*J. Indust. Hyg.* 15, 5, 320–340 (Sept.), 1933. L. G.

Health Aspects of Radium Dial Painting. I. Scope and Findings—This report is the result of investigations conducted in the radium dial painting industry. This report consists of findings and recommendations. Seven factories were studied; 14 men and 228 women were examined. In the analysis the female radium workers were divided into two groups, one group consisted of workers who were exposed to radioactive substances before pointing the brush with the mouth was prohibited in every plant and the second group contained those workers who have been exposed to radium only under the new conditions. The results of the study indicated that the abolition of pointing the brush with the mouth has not entirely solved the problem of radium deposition in the body.

Tests demonstrated the presence of radioactive substances in the air of the workrooms. An average of 9.8×10^{-10} gm. of radium per 10 cu. m. of air was detected. The average gamma exposure of the workers was equivalent to that which would be produced by about 1 mm. of radium 50 cm. from a worker.

Twenty-eight recommendations are made for minimizing the hazard in radium dial painting. These suggestions pertain to factory cleanliness, personal cleanliness of the workers, protection of workers by means of screens and hoods, and adequate ventilation.—Louis Schwartz, Fred L. Knowles, Rollo H. Britton and Lewis R. Thompson.—*J. Indust. Hyg.* 15, 5:363–367 (Sept.), 1933. L. G.

Lead Absorption and Excretion in Certain Trades—This investigation consists of the study of lead excretion of workers in manufacturing plants when lead is involved. The results may be tabulated as follows:

		Mean Lead Concentration in Milligrams		
	Degree of Exposure	White Lead Mfg. plant	Elec. Storage Battery plant	Tetraethyl Lead Mfg. plant
Feces (per gram Ash)	Severe Exposure	0.870	0.70	0.201
	Moderate "		0.52	
	Mild "		0.22	
	Average "	0.573	0.45	0.186
Urine (per liter)	Severe Exposure	0.336	0.330	0.198
	Moderate "		0.176	
	Mild "		0.124	
	Average "	0.241	0.182	0.129

Clinical lead poisoning was observed in the white lead manufacturing plant and in the storage battery plant, while the tetraethyl lead plant had no such histories during a 5-year period of observation.

The rate of urinary lead excretion varies with the rate of lead absorption in normal persons without occupational lead exposure but increased exposure fails to bring about a corresponding increase in the urinary excretory rate. It is believed that lead exposure is safe if the mean lead excretion is not more than 0.6 mg. per day in the feces and 0.15 mg. per liter in the urine. If conditions are such that lead is excreted at a mean rate above 1.1 mg. per day in the feces and 0.21 mg. per liter in the urine, cases of lead poisoning may be expected to occur among exposed workers.—Robert A. Kehoe, Frederick Thamann and Jacob Cholak. *J. Indust. Hyg.* 15, 5:306-319 (Sept.), 1933.

L. G.

Health Aspects of Radium Dial Painting. II. Occupational Environment—The occupational environment of radium dial painting is dis-

cussed in this paper. This includes a history of the radium dial processes; a description and analysis of the occupation; and a sanitary survey of 7 radium dial painting plants.

Radioactive dust determinations were

made by taking atmospheric dust samples in paper thimbles as a collecting medium at a rate of 2 cu. ft. per minute. The analyses showed an average exposure of 26.1×10^{-10} gm. of radium per 10 cu. m. of air for dial painters as compared to 9.8×10^{-10} gm. per 10 cu. m. of air for the general air of the room. The occupation of radium dusting gave the highest average concentration of 169.3×10^{-10} gm. per 10 cu. m. Considerable variations in the average radium exposure were noted in different plants for the same occupation.

Electroscopic determinations of the amounts of gamma and beta radiations and of radon were also made. The gamma radiation was found to be equivalent to the discharge produced by about 1,200 micrograms of radium 50 cm. from the instrument and the beta equivalent was 2,100 micrograms of radium. The radon readings gave an average of 51 curies $\times 10^{-8}$ per 10 cu. m. of air which was about 2,000 times the content of normal outdoor air.—J. J. Bloomfield and F. L. Knowles. *J. Indust. Hyg.*, 15, 5:368-382 (Sept.), 1933.

L. G.

FOOD AND NUTRITION

The Stability of Vitamin A in Cod Liver Oil Emulsions—The possibility of considerable destruction of vitamin A in cod liver oil on emulsification with gum acacia through the action of peroxidase in the gum acacia and the exposure of a considerable surface of the oil to air during homogenization was tested by preparing five different emulsions of cod liver oil, allowing them to stand in well corked amber bottles in a dark cupboard for varying periods of from 2 days to 15 months, recovering the oils from the emulsions, and testing them by the colorimetric procedure of Drummond and Hilditch (E.S.R., 64, p. 694).

The emulsions included two with gum acacia and 50 per cent cod liver oil and two with gum tragacanth (containing no peroxidase) and 25 per cent cod liver oil, one of each being homogenized and the other not homogenized. Another emulsion was made with gum acacia previously heated at 100° C. for 1 hour to destroy peroxidase and 50 per cent cod liver oil and not homogenized. Samples of the cod liver oil and the homogenized emulsion with gum acacia were also tested spectrographically by R. A. Morton at the beginning of the experiment and after 7 months.

No loss in vitamin A potency could be detected in the original oil or any of the emulsions for at least 4 months. At 6 months there was some evidence of change, particularly in the original oil. At 7 months the change was evident in all of the gum acacia emulsions and the non-homogenized gum tragacanth emulsion, and from that time onward in all of the samples. The spectrographic studies likewise showed no

greater deterioration in the emulsified oils than in the original oil.

The authors conclude that the procedure followed in manufacturing emulsions of cod liver oil does not diminish the natural stability of the vitamin A in the oil itself during storage, and that "cod liver oil emulsions can be kept for at least 4 months without appreciable loss of vitamin A potency, and probably for 7 or 8 months without serious alteration therein, if stored in well stoppered, amber glass bottles and kept in the dark."—H. N. Griffiths, T. P. Hilditch and J. Rae, *Analyst*, 58:65, 1933; Abstr., *Exper. Sta. Rec.* 69:759 (Nov.), 1933.

Losses of Vitamin A in Drying Fresh Raw Carrots and Sweet Potatoes and Canned Spinach—In this experiment, the vitamin A content of dried carrots, sweet potatoes and spinach was compared with the vitamin A content of the raw carrots, canned spinach, and raw sweet potatoes. Sixteen groups of rats were used in the experiment. The material tested was fed twice a week. The raw yellow carrots contained approximately 43 units of vitamin A per gm. of raw fresh material containing 11.4 per cent dry matter. Approximately 80 per cent of the vitamin A content was lost during drying. The raw sweet potatoes contained approximately 20 units of vitamin A per gm., while the loss of vitamin A on drying was 29 per cent. The canned spinach contained 140 units of vitamin A, while the loss on drying was 65 per cent.

While these results do not disclose whether there is a loss of vitamin A

on storage, they do show that stored fresh food or canned food may be higher in vitamin A than the dried material.—G. S. Fraps and Ray Treichler, *J. Agri. Res.* 47:539 (Oct. 1), 1933.

The Vitamin A Content of Pimiento Pepper—In determining the vitamin A value of the pimiento pepper, three series of experiments were run: first, on the fresh pepper; second, on the canned pepper; and third, on the dried pepper. The fresh peppers were kept in hydrators under refrigeration; the canned were commercially canned; and the dried material was prepared by coring the pods, cutting, pressing, washing, and after a second pressing, drying at 38° C., finely grinding and packing under vacuum.

Rats were depleted of vitamin A, but vitamin D sufficiency was maintained by viosterol. Standard carotene obtained from the Bureau of Chemistry and Soils, U. S. Department of Agriculture, was dissolved in Wesson oil and stock solutions made up so that 0.5 c.c. contained respectively 0.002 mg. and 0.006 mg. of carotene. Carotene was determined in the pepper as 0.33 gm. per kg. of dried material. Carotene content in the fresh and canned pimiento was computed. The daily intake was from 0.00033 to 0.00132 in the dried pepper, 0.00043 to 0.00086 in the canned pepper, and 0.00135 to 0.00251 in the fresh pepper. Carotene was fed at the 0.001 mg. and 0.003 mg. level. The growth response on the same levels are comparable and the figures indicate that the unit for dried pepper lies under 2 mg. but it is not established that it is as low as 1 mg.—Leah Ascham, Georgia Experiment Station, *Bull.* 177, Sept., 1933.

The Vitamin C Content of Commercially Canned Sauerkraut Produced Under Known Conditions—This reports a continuation of a study

previously reported on the antiscorbutic value of commercially canned sauerkraut. In the former study (*J. Agri. Res.* 41:51, 1930), six commercial brands were used, and data here represent 4 of the 6 previously reported, eliminating the two which scored highest for vitamin C. Of the 4 samples of the sauerkraut, 3 were machine packed and 1 hand packed. The acidity expressed as lactic acid varied in the cans examined, from a minimum of 1.10 per cent to a maximum of 1.49 per cent. The pH value in all cases was 5.2.

The ration used as a negative control resulted in the development of pronounced scurvy in 16 days, but prevention of scurvy in the positive controls resulted with either 5 gm. or 2½ gm. daily intake of raw cabbage. Of the 4 brands tested with 10, 7½, 5 and 2½ gm. daily doses, 2 of the brands were found to contain a definite amount of vitamin C, complete protection being secured with 7½ and 5 gm. in one sample and 10 and 7½ gm. in the other. Two and one-half gm. doses failed to protect in either of these two brands. A 5 gm. daily intake did not protect in one of the brands. Two other brands failed to give protection at any level including the 10 gm. daily intake. Scurvy occurred just as quickly with these two canned sauerkraut supplements as in the negative controls.

Although the details of the manufacture and canning of the sauerkraut show no common factors which would account for the great difference in the antiscorbutic value, it is significant that the two brands in this experiment which show a definite protective value repeated the results shown by these same two brands in the former work.

In the two brands which rated highest, the same variety of cabbage was used for the sauerkraut, but in one of the cans showing no protection against scurvy 70 per cent of the cabbage was

of this same variety. The authors attribute the differences to some undetected factor or factors not disclosed in the experiment which may be dependent upon the manufacturing procedure.—Helen T. Parsons and Carolyn Horn, *J. Agri. Res.* 47:627 (Oct. 15), 1933.

Growth of Rats Fed High Protein Rations Supplemented by Different Amounts and Combinations of Vitamins B (B₁), G (B₂), and B Complex—Although high protein diets are conceded as adequate for carnivora, the literature shows conflicting reports in the case of omnivora and herbivora, both normal and subnormal rates of growth being reported on rations containing 45 to 95 per cent of casein.

The investigation here reported undertook to answer this question also as to the reported need for increasing B vitamins in animals on high protein rations. The data include rats used in another experiment in which they had been subjected to a right unilateral nephrectomy. In these cases the controls were similarly nephrectomized. Casein was fed *ad libitum* at 18, 50, and 90 per cent levels, including vitamin-bearing adjuvants, supplemented with daily allowance of cod liver oil and wheat germ oil. The vitamins B, G, and B complex were supplemented by dried yeast, tikitiki extract, and autoclaved yeast.

As shown by mean gains in weight, there was no difference between the nephrectomized rats and those which had both kidneys intact in any one of the 3 levels of casein employed. Ninety per cent of casein plus 0.4 gm. of yeast produced inferior growth in both nephrectomized and intact rats compared to controls. Increasing the protein allowance equalized the growth between the intact and controls but resulted in inferior gains for the nephrectomized rats compared to their controls.

Rats on the 50 per cent level grew as well as controls on 18 per cent of this protein and better than those on the 90 per cent level. The optimum level for protein for rapid growth is probably between 18 and 50 per cent. The need of rats on high protein diets for increased amounts of B and G vitamins is not apparent where yeast alone is the source for 0.8 gm. of yeast produced better results than either one-half or twice that amount.

Supplementing either the controls or the high protein diets in the absence of yeast, with a maximum of vitamin G from autoclaved yeast and a minimum of vitamin B from tikitiki extract or the reverse of these vitamin substances, resulted in an unsatisfactory growth response.

From the data on a small number of rats, there is an indication of better utilization for growth of the rich protein diets than in the case of a ration containing 18 per cent casein.—Lillias D. Francis, Arthur H. Smith, and Lafayette B. Mendel, *J. Nutrition*, 6:493 (Nov.), 1933.

Destruction and Survival of Microorganisms in Frozen Pack Foods—Experiments are reported concerning the fate of microorganisms in berries and vegetables held under different conditions of oxygen environment and low temperature storage, together with observations on the effects of CO₂ of respiration on microorganisms in packs of berries and in artificial media. The storage periods used varied from 14 weeks to 2 years.

A series of storage experiments are presented on berries packed in sucrose solutions of different concentrations and stored in paraffined paper cups and in cans both vacuumed and without vacuum for periods extending from 14 weeks to 13 months at temperatures from -2° C. to -20° C.

In this experiment it was demon-

strated that there was a much less rapid decrease in bacterial numbers at -20° C. than at -10° C. regardless of whether the container was airtight or not. There was a rapid increase of microorganisms in non-airtight containers, and a decrease in sealed containers at -2° C. and -4° C. A more rapid decrease in microorganisms was observed in sealed than in non-airtight containers at -10° C. and -7° C. It is suggested that these phenomena are in part explainable on the ground that in sealed containers of fresh fruit the evolution of CO_2 previous to the ice formation exerts a destructive influence on the microorganisms.

Containers of fruit heated to prevent evolution of CO_2 failed to show appreciable decrease in microorganisms. Cultures of molds, torulæ and yeasts subjected to various freezing storage temperatures in suitable liquid media, showed that the death rates at -6° C. are lower and at -10° C. slightly higher than at -20° C. *Cladosporium* was capable of growth at -2° C. while *oidium* and *torula* at -4° C. on small fruit in non-airtight containers.

Of interest to public health workers and food control officials is the persistence of lactobacilli and members of the colon-aerogenes group of bacteria, chiefly genus *Aerobacter* observed in connection with the studies of freezing storage of vegetables. Evidence is presented that lactobacilli and to a lesser extent "colon-group" organisms persist in peas for at least 2 years at -10° C. and that "colon" organisms in string beans and spinach at -10° C. for at least 19 months and 10 months respectively. It was also observed that bacteria presumably of the genus *Pseudomonas* showed a definite increase in peas stored at -4° C.

A study of the destructive effect of ice formation on yeasts was presented in which the organisms suspended in wort were stored in both liquid and frozen conditions at -10° C. A much more rapid decrease of viable cells was shown in the frozen than in the unfrozen liquid wort indicating the destructive effect of ice-formation on the test organisms.—J. A. Berry, *J. Bact.* 26:459 (Nov.), 1933.

The Stimulating Action of Copper on Erythropoiesis—Albino rats were taken from their mothers when 21 days old and kept on a diet of evaporated milk, or of raw milk supplemented with copper in some cases. The copper was fed as copper sulphate in an aqueous solution of such strength that 0.5 c.c. contained 0.25 mg. of copper, or, if less copper was used, 0.025 mg. The animals were weighed weekly, and hemoglobin determinations and erythrocyte counts made biweekly at first and then weekly.

The rats which were fed raw milk alone showed a sharp fall in hemoglobin and red cell count, while the animals fed diluted evaporated milk showed a less rapid fall in hemoglobin but an increase in erythrocytes. When copper without iron was fed as a supplement to raw milk, results similar to those with evaporated milk were obtained, indicating that the copper in the evaporated milk is responsible for the temporary maintenance of a high erythrocyte count.

When given as a supplement to the milk diet of anemic rats, copper ranging in amounts from 0.025 mg. to 0.5 mg. daily shows a definite erythropoietic action without any influence on hemoglobin formation.—Hermann B. Stein and Robert C. Lewis, *J. Nutrition*, 6:465 (Sept.), 1933.

CHILD HYGIENE

CHILD WELFARE IN GERMANY

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THE reorganization of public health and child welfare in Germany under the new government has progressed far enough to discern its main lines of development and to make possible a sketch of the present phases of that development. It should be grasped at the very beginning that the "Revolution" is over and that the "Third Reich" under the supreme command of Reichcounsellor Adolph Hitler and his small group of advisers is an accomplished fact. The political changes which have recently taken place all tend toward a highly centralized state, although in its administrative control considerable latitude within the general regulations is allowed for local conditions. This shift in control has affected every phase of political, social, economic, and educational life in Germany. It is now being applied with vigor to the welfare and public health fields. Centralization and uniformity of control appear to be the watchwords.

Hitler has repeatedly stressed the importance of working for the good of a whole united Germany. "Each for all and all for each" is a favorite slogan which has captured the masses. His speeches ring with an assurance that he has in mind the welfare of the entire population and not benefits to any privileged classes.

Considerable attention is now being given to ways and means of strengthen-

ing family ties. To this end the maternity and child welfare measures so well conceived and worked out during the past 25 years in Germany are being taken over in their entirety and incorporated in the new schemes. Several pieces of recent legislation are of considerable interest in indicating present trends. Provisions have been made to encourage at least 200,000 couples to marry annually by promising to advance to each couple 1000 reich marks with which to help furnish their homes. This sum must be repaid in easy installments with the exception that the government will not require 250 marks for each child which the family may have. Provisions to protect the pregnant woman and to provide for her welfare before, during and after confinement are being strengthened. The premium given to those who nurse their babies at the breast during the first three months is also to be continued. There is widespread, persistent and attractive propaganda to idealize family life and to urge the propagation of healthy offspring. Birth control from its contraceptive side is frowned upon. On the other hand positive measures to cut down the propagation of unfit stock have been seriously proposed. The recent so-called "eugenic sterilization law" which has been promulgated makes it obligatory for physicians and institutions to report to a specially created "Amt" or Bureau all cases of feeble-

mindfulness, insanity, schizophrenia, chronic alcoholism, and other mental disorders. The individuals may submit voluntarily to the most approved methods of sterilization, or if they do not submit and are judged suitable subjects for sterilization by special boards, they will be forcibly subjected to sterilization. The machinery for this act is already being assembled. It is stated that by January 1, 1934, the whole legislation will become effective. This is by far the most radical step taken by any nation in attempting to eliminate the "unfit." It has already stirred up considerable criticism and protests from outside Germany. The German press, strictly censored, of course, has come unitedly to its support. Private conversations with professional men reveal difference of opinion as to whether it can be carried out successfully.

The latest measure of medical and public health interest is the promulgation by Minister Goering of an order forbidding vivisection. Goering in a radio speech stated that this is not intended to hamper scientific research or modern medical needs, but that all animals submitted to experiment must be thoroughly anesthetized and that any "unnecessary cruelty" will be punished. Just how far these regulations will actually affect the experimental work now being carried out in the laboratories of Germany it is difficult to state.

Another change which has taken place recently is the consolidation under one administrative head of all physicians working in any capacity in the child welfare or child hygiene stations in Greater Berlin. As the new Director expressed it, "There will no longer be infant welfare doctors, preschool doctors, and school doctors, but each doctor will be expected to handle family problems of health in children of whatever age. The family practice must be the unit."

There has undoubtedly come about a considerable distrust for the professional social worker. One man close to governmental affairs remarked that the new administration will use as few such workers as possible and depend more upon enlisting the interest and help of voluntary workers who knew the social and family problems in their immediate neighborhoods. There is a strong feeling that other technically trained workers such as physicians, trained nurses, and public health officials are in a better position to judge of the social conditions than professional social workers. Many of the new regimen appear to distrust social workers who, they feel, have tended to radical, socialistic, or communistic ideas and therefore have no place in the new order.

While there are still a considerable number of day nurseries operating in the larger centers of population the new administration seems to consider them but temporary expedients. Nursery schools have never attained the position in Germany that they have in England and the United States. Again one hears it expressed by those sympathetic to the new regimen, that the money used to support day nurseries and kindergartens had better be applied directly to the homes where the mothers should be encouraged to remain and look after their young children. This of course is only another version of the old slogan that, "the place of the woman is in the home."

The child welfare centers, of which there are many in the larger cities, continue to take children from birth until school entrance. The centers which have thus far been visited appear to be working at full pressure with very devoted staffs. There have been many changes in personnel in these centers and the question naturally arises, "Will the new professional and voluntary workers bring to the work the same skill

and devotion as the old?" Only time will permit of an answer to this question.

From all that can be gathered regarding the condition of the younger children, they appear on the whole in good condition. Even in families provided for on governmental and municipal "dole" the children seem to be well fed and happy in their play. A visit to one of the largest welfare distribution centers in Berlin revealed a surprisingly neat, orderly, and expectantly hopeful lot of people receiving material relief. One does not see the abject poverty, beggary, and degraded condition of the people as noted in many of our American cities during the depression. Provision is made to supply essential fats and milk for the children as a first item on the dietary.

It is true, however, as a number of physicians have vouched for it and has been noted by direct observation, that the children between 3 and 6 years of age appear to be undernourished in many instances. On the other hand, the school children and especially those of adolescent age seem to be in excellent condition. One of the amazing things in Germany is the great enthusiasm of the youth for the new regimen. The

Youth Movement has developed a marked idealism. Hitler is worshipped as a hero by all classes of youth. The buoyant, joyous, hopeful life of present-day youth of Germany is one of the marked features of the new regime. The outdoor life with its regimentation, simple but wholesome food, exposure to sun and active sports is surely creating a vigorous young manhood and womanhood, whatever its by-products may be.

One of the most interesting revelations to an American is the more or less general acceptance by German physicians of the idea that the nutritional status of the baby and young child largely determines its immunity against a number of the infectious diseases. There is not much enthusiasm for toxin-antitoxin or toxoid in Germany. Anti-toxin is used in the institutions as an immediate prophylactic and curative agent but the widespread use of T.A.T. such as in the United States does not appear. The unfortunate Lubeck affair has of course influenced many physicians to caution. Immunization against tuberculosis has received a complete setback in Germany.

Vienna, Austria

November 2, 1933.

PUBLIC HEALTH NURSING*

A Tip for School Nurses and Health Education Teachers — M. Barbara Dee of Boston says in the November (1933) *Hygeia* that for some years she has conducted a health class for high school girls by the old stereotyped method of lectures and recitations on general hygienic subjects, which bored both her and the girls.

She finally shook herself out of her lethargy and got to thinking. As a result she decided to treat health subjects in the light of the needs of the girls in their probable future business and professional careers.

She collected forms used by business houses rating applicants for employment. Her cue was to have the first lesson on the importance of personal appearance in applying for and keeping a job. Here was a good chance to discuss the condition and care of hair, skin, teeth, eyes, posture, and dress, subjects which, enlarged upon, were broad enough to constitute the outline of work for the whole course.

In the work on the skin and its care, in addition to considering the kinds of baths and their uses, discussions were held on the various ways of cleansing the face, and relative advantages of soap and water and of creams, the sort of face powder to use and how to use it, and the correct kinds and uses of make-up. With regard to the hair, I showed in class various kinds of hair brushes and how to use them, and demonstrated the uses of hair tonics.

Toward the end of the course when the girls had acquired some background for judging, they became increasingly critical of advertising material seen in newspapers and magazines. At this

point, Miss Dee felt they were ready to go into community health problems under the subject "The Business Woman as a Citizen." She says, "a most interesting lesson led to a determination of what proportion of the average citizen's salary actually went to support community health agencies." This caused them to wonder what the citizen got in return for these expenditures. The logical thing then was to visit various community agencies, confer with department heads, read their literature, and have municipal and health department officials lecture to the girls. The interest and vital importance of these trips to the girls was shown by the fact that most of them voluntarily took time after school to make them.—M. Barbara Dee, *Health for the Business Woman, Hygeia* (Dec.), 1933, p. 1132.

A School Physician Writes the Editor of the Nursing Section—

His Letter—"Will you give me your opinion as to how much treatment and what kind of treatment may be rendered by the school nurse to school children? Is it the province of the school nurse to treat cases of impetigo and ring worm? How often may she dress contusions, abrasions, wounds, and infections, etc.? Is it permissible for her to use a therapeutic lamp in the treatment of certain injuries sustained by the athletes? How much responsibility, if any, beyond first aid must the nurse assume?"

The Reply—"I quote from the N.O.P.H.N. *Manual of Public Health Nursing*, Second Edition, Macmillan, New York, 1932, in the chapter on School Nursing Service (page 173):

* Please send printed matter or other material relating to public health nursing to Eva F. MacDougall, 6 State House Annex, Indianapolis, Ind.

"Treatments are given by the nurse only when she is working under a medical director or when a medical advisory committee has agreed upon standing orders." I fully agree with this.

If you have school nurses they should own Miss Chayer's *School Nursing*, G. P. Putnam's Sons, New York, 1931, which, on pages 46-48, treats of the school nurse and skin infections.

I have just been visiting the school health service in Evansville, Ind., which has a good medical director, Dr. C. C. Wilson, with six school nurses on his staff. Dr. Wilson gave me a copy of the *Standing Orders*, which his school nurses follow, a copy of which I am sending on to you. I know that Dr. Wilson works closely with the medical society in his community, and I feel that we can take his procedures and rules as models. You will note that Dr. Wilson's nurses make every attempt to urge home care of skin diseases by the family physicians, but he authorizes them to treat neglected cases at school. I feel that no school nurse should do this, however, without authorization by the chief medical inspector or a medical advisory committee from the local or county medical society.

In the *Manual of Public Health Nursing* (above referred to), on page 173, under "General Policies in Handling Emergencies" (referring to school nurses), the following statements are made, with which I agree:

"For injuries or accidents occurring in the home or out of school, responsibility rests primarily with the family physician."

"The nurse should not disturb a dressing put on by the family physician except at his request. She should not assume responsibility for the care of infections, but should impress on pupils, parents, and teachers the importance of a physician's care for such cases."

The first aid dressing is the only one the nurse should apply without definite orders from the family physician or school physician.

I think it is permissible for the school nurse to use a therapeutic lamp in the treatment of certain injuries sustained by athletes if she does it under the direction and supervision of a physician.

Of course, I think that first aid is a very minor part of a school nurse's duties. Her greatest value comes from her ability to teach, to be an interpreter of "medical, sanitary, and social procedures for the correction of defects, prevention of disease and the promotion of health." I am enclosing a copy of the *Objectives in Public Health Nursing*.^{*} Note under IV, those for the school age group. School nurses have a big task and should be well qualified for their work. I am enclosing the *Minimum Qualifications for Those Appointed to Positions in Public Health Nursing*.^{*} I don't know whether you have one school nurse or a supervising nurse and several staff nurses, but these standards ought to guide you as to what their qualifications should be before they are employed to do public health nursing in your schools.

NOTE: Since this letter was sent off, the matter of the therapeutic lamp mentioned was discussed with a school physician. His comment on the statement that the school nurse can use such a lamp if she does it under the direction and supervision of a physician was:

"The statement, as worded, undoubtedly takes care of the problem from the point of view of the school nurse. However, from the point of view of the school physician, I do not believe that he should assume such responsibility. His function is in the field of health protection and health education, and treatment of any sort, including that given by a therapeutic lamp, should be in the hands of the family physician or of some physician appointed to treat indigents."

^{*} Copies may be obtained from the National Organization for Public Health Nursing, 450 Seventh Avenue, New York, N. Y.

EDUCATION AND PUBLICITY*

Life Membership in A.P.H.A.—Twelve applications for life membership were presented for action at Indianapolis. Four of this number were from the Public Health Education Section. Also this section offered 7 applicants for Fellowship.

Usable Bibliographies on Child Health—We have mentioned the usability of the mimeographed reading lists issued by the Educational Service of the American Child Health Assn., 450 7th Ave., New York, N. Y.

A group of new issues and revised editions has been issued. *Single copies free.*

The lists illustrate how even very brief reading lists for teachers or for health workers may be made helpful and usable.

"The Administration of the School Health Program." 9 pages. "Some references which consider school health problems from the viewpoint of the school administrator." Includes: "General Policies and Principles," "Administering the School Health Program," "The School Health Program" (health service and health education).

"Health Education Bibliography: Junior and Senior High School." 5 pages. For administrators and instructors. "Helpful When Laying Plans," "Helpful When Subject Matter and Method are Being Considered," "Examples of Work Accomplished," "Of Special Interest to Teachers of Science," "Some Tests that Have Been Used to Evaluate Programs," "Useful When

Looking for Reference Material of Special Interest to the Pupils."

"Health Education in Elementary Schools." 5 pages. *References "selected to help the teacher to find guidance material, reliable and easily available. A series of searching questions with answers in the form of reading references.

"Some Recent Contributions to Health Education." 3 pages. For instructors giving courses in health education.

"Supplementary Reading Materials for Health Education." Grades I to IX. 6 pages. "Interesting types of reading suitable for classroom libraries."

Of Course We Want to Know Both Sides—Not often does governmental action arouse as much discussion in the business and advertising worlds as has the so-called "Tugwell Bill." Much of the discussion in the trade press is wild and far from the mark. But there has been much thoughtful and high-minded consideration of the bill.

There seem to be good reasons for believing that the bill should be modified, but in its present form it has rendered high service in helping leaders in the food, drug and cosmetic business to face realities from the public health point of view. The educational value of the bill in advance of Congressional action makes it worthy of mention in this department.

But public health workers who may explain or support the bill will not wish to overlook the questions raised by business men, many of whom very much want protection for their ethical businesses, as well as protection for the

* Please address questions, samples of printed matter, criticism of anything which appears herein, etc., to Elvert G. Rostkahn, 139 East 22d St., New York, N. Y.

health of the public. Few of the references to the bill in public health journals suggest that both sides have been studied.

Look up recent issues of *Business Week* (New York) or any leading advertising journal, especially those for November and December. *Advertising and Selling*, 9 East 38th St., New York, N. Y., should be especially helpful. Note particularly articles in the Dec. 7, 1933, issue (15 cents), and the editorial, "Concerning Certain Misgivings About Food and Drug Enforcement."

Too Much Psychology?—Is it too much, because it is not enough, when we take selected emotions out of a box (or a book), pick the motivation buttons to press, and presto! we have changed or corrected, controlled or corralled the desired health habits!!

An author, discussing the writing of letters in *Printers' Ink Monthly* (185 Madison Ave., New York, N. Y. Dec., 1933, 25 cents), has some doubts about the ability of anyone who has acquired his psychology from a textbook, to put it to work:

"What do you think is wrong with these letters—or the people who wrote them, Leo?" I asked.

"I won't attempt to answer that one," he replied. "But here is the conclusion I've come to after studying a couple of hundred letters.

"Most of the letter-writers have apparently read the same books on psychology that I have. They also have been told that the first sentence or paragraph of a letter should be an attention arrester. So they start in psychoanalyzing—and if you don't think so just study carefully the letters you receive, particularly those designed to sell you something. You'll find that the writers of practically all of these letters have made a long-distance study of your inhibitions, complexes, fixations, or what have you. They have tried—oh, so hard and painstakingly—to adapt their letters to your nature. While they were trying to get you into a mental state in which you would be more willing to accept their proposition, they let their real message jell into a mess of hodge-podge."

"Well, you discovered something, didn't you, Leo? You found out for yourself that although it is often said that most anybody can write a good letter, very few do; that it wouldn't be so bad if letter-writers 'wrote as they talked,' but if they talked as they wrote, many of their listeners would think they had gone bugs."

Beginnings and Growth—Only recently have we looked up "Health Education" in *Encyclopedia of the Social Sciences*. This article by Dr. Iago Galdston devotes 8½ columns each 8½ inches long to the beginnings of health education and its development in recent years, to which is added a column of reading references. We believe that no other source will give so comprehensive and so readable a review. Surely all who are concerned with popular health education should read the article. Of course this seventh volume of the *Encyclopedia* is available in public and university libraries.

Several details are likely to cause some confusion. In naming national organizations there is lack of consistency in the use of the original or the present-day titles. The extensive and useful bibliography omits several significant references. Then it will be well to remember that a number of the activities and periodicals for which starting dates are given are no longer in existence.

"Hygeia," December, 1933—The editorial presents the a-b-c of "Amebic Dysentery," followed by:

"Holiday Follies"; "Let's Make Winter Sports Safer"; "Unpleasant Breath: A Symptom of Disease"; "Training for Athletics and Health"; "Waist-Lines and Life-Lines: Control of Obesity"; "Medical Notes from the Diary of Samuel Pepys"; "School Health Work on the Labrador"; "Before Baby is Two: Helping Baby to Learn"; "A Housewife Looks at the Committee on Foods"; "Exhibits at A Century of Progress"; "Feminine Beautification"; "What to Do for the Cross-eyed Child"; "Sex Education: The Period of Adolescence"; "A

Century of Progress in Medicine"; "Doorstep Babies" (the deserted ones); "After-Care of Infantile Paralysis"; "I Want to Know: What Happens When Your Heart Beats"; "School and Health," including "Boston's Contribution to Health Education"; "Teaching Health" (devices and methods); "New Health Books and Teacher's Materials"; "New Books on Health"; "Questions and Answers."

Slogans in All Languages—Can you get your slogan translated into all the languages spoken in your community, or your state?

You might make the translation job into a contest, giving awards for the most accurate and carefully written translations. Before the awards are announced you might give out the list of languages already represented, asking for other languages actually spoken in your community, or simply invite additions whether or not they are in use in your territory.

Legibility Makes Indexes Usable
—Small type, volume numeral in italic Roman, and article titles in all caps—these are features of the index of a health bulletin or house organ. Copy text on both pages of the index was short so that lack of space could not be the reason for the small type.

"In a City of Medium Size"—
"Social Hygiene Education," by Jean B. Pinney, is a review of one of the experimental campaigns conducted by the American Social Hygiene Association, with the coöperation of other agencies. This report of an educational campaign in Reading, Pa., "a city of medium size," tells of "Sponsorship for the campaign, financing, plans and objectives, campaign methods, newspaper coöperation, special coöperation with physicians, coöperation with civic and social groups, in the schools, industrial coöperation, training speakers, literature, films and exhibits, radio and checking campaign results."

The letter of invitation to sponsors is reproduced, as also the letter to employers having 50 or more employees, the educational folder, a wash-room placard, a talk announcement, and a letter to physicians. A page of newspaper clippings shows headline use of "gonorrhea" and "syphilis."

An effort was made to arrange a broadcasting program concerning the campaign, but the radio authorities, while regarding the talks which had been prepared as effective, felt it wise to decline for fear that some conservative listeners might complain to the State Radio Commission of the discussion of medical aspects of syphilis and gonorrhea.

In *Journal of Social Hygiene*, 450 7th Ave., New York, N. Y. Nov., 1933. 35 cents.

"Explain! Explain! Again Explain!"—Thus Sherwood Anderson writes to editor of *Today*, 152 West 42d St., New York (Dec. 2, 1933. 10 cents). "It is the thing needed. It must be done now, over and over, patiently and persistently."

Mr. Anderson is writing about social and economic problems. His plea might well be addressed to public health workers who need to "Explain! Explain! Again Explain!"

RADIO
We used to hiss speakers. Today we merely twist the dial.—*Atchison Globe*.

State and city departments and associations not mentioned below are invited to send copies of broadcasts as issued. With a view to increasing legibility the titles are written here as topics.

Baltimore City Health Department, Tuesdays, 6:00 p.m. over WBAB

Trichinosis; Baltimore's milk supply; Help control whooping cough; Safeguarding the drugs you take; Arthritis; Amebic dysentery; and "Mrs. Wells Learns About Tuberculosis" in which "Miss Truitt," a Health Department nurse, answers the questions of "Mrs.

Wells" (who is interested in a neighbor's daughter). *Copies free to health workers.*

Connecticut State Department of Health, Hartford:

Growth of children; Public health: Organized effort; Health in old age; Cost of venereal disease control (syphilis and gonorrhea are named); Some reasons for our behavior; Finding tuberculosis cases early; Seasonal growth of children; How clean is clean? *Copies free to health workers.*

Connecticut State Health Dept., Hartford, has announced broadcasts for every Thursday, 1:25 p.m., via WTIC, up to June 28, 1934. List of titles *free*.

Illinois State Department of Health, Springfield:

The drama and comedy of anesthesia at Century of Progress; A Century of humane care of the insane and nervous; Ninety years of Robert Koch at Century of Progress; A strange and new phase of modern medicine and biology; A century of progress in dental health; Progress in occupational therapy at the World's Fair; The use and abuse of Illinois streams by man; A health officer looks at milk at Century of Progress; Insomnia and public health; Health value of communications exhibits at Century of Progress; A century of progress in hospitalization; Two centuries of Joseph Priestly and his discovery of oxygen. *Copies free to health workers.*

The Century of Progress broadcasts from Illinois are likely to contain usable material which need not tie up with the World's Fair.

MAGAZINE ARTICLES

"Don't Drop Your Guard." Page editorial in *Colliers Weekly*. Dec. 2, 1933. "Germs know no social barriers nor are they interested in bank accounts." An especially timely and constructive statement with more than 2,000,000 circulation.

"Eyestrain: What It Is and How to Avoid It," by Margaret Schaefer. *American Federationist*, Washington, D. C. Nov., 1933, 20 cents.

"Heroes of Health," a series of three articles, describe "heroism of workers in the U. S. Public Health Service." By a staff writer of N. E. A., that is, News-

paper Enterprise Association, serving Scripps-Howard and other newspapers.

"Ready for Winter?" by Dr. Walter R. Ramsey. *Farmers Wife*, St. Paul, Minn. Nov., 1933. *Sample free*. This is one of the articles on child care which appear monthly with more than a million circulation. Possibly you have met one of the editors, Carroll P. Streeter, at A.P.H.A. Annual Meetings.

"Should the States Control Medical Care?" A debate prepared by Prof. Walter B. Emery. *Scholastic*, Chamber of Commerce Bldg., Pittsburgh, Pa. Nov. 25, 1933. Introductory review of the question: "Affirmative Brief" ("I. There is need for a change in our present system of private medical practice"; "II. The proposed plan would remedy the evils of the present system."); "Negative Brief" ("There is no need for the proposed change of the Affirmative"; "II. The proposed plan is undesirable"; "The proposed plan would give rise to other evils"); "References" (General; Affirmative; Negative). Copy for 10 cents.

To be announced in bulletins or house organs, posted on bulletin boards, and otherwise brought to the attention of new readers.

"America's Contribution to Leprosy Control," by L. E. Danner. *Literary Digest*. Nov. 4, 1933.

"Common Colds," by J. A. Tobey. *American Mercury*. Nov., 1933.

"Euthanasia Considered," by H. E. Barnes. *New York World-Telegram*. Oct. 27, 1933. "It would put an end to a vast volume of unnecessary human suffering."

"Patent Medicines and the Law," by A. J. Cramp. *American Mercury*. Nov., 1933.

"She Couldn't Change a Tire. But—," by Willard Price. *Rotarian*, 211 West Wacker Drive, Chicago, Ill. Nov., 1933. 25 cents. The working day of a rural nurse and the results of a county health survey.

HOUSE ORGANS

Doubtless all of our Canadian readers are familiar with *Bulletin* of the Canadian Tuberculosis Assn., Plaza Bldg., Ottawa, Ont.

Ke Ola O Hawaii, P. O. Box 39, Honolulu, T. H., is published by the Tuberculosis Assn. of Hawaii.

Non-residents, 24, residents, 29, a total of 53, the automobile death toll of New Haven in both 1931 and 1932, was exceeded by 11 in 1929. So reports *Health*, New Haven Dept. of Health on its cover page.

"Timely Tips on Scout Protection," by F. C. Mills. *Scouting*, 2 Park Ave., New York. Dec., 1933. 10 cents. "Orders or Instructions—Which?" The futility of "arbitrary protection" without "educational follow-up."

The July-Sept., 1933, issue of *The Commonwealth*, Massachusetts Dept. of Health, is an example of the one-subject house organ. "Epidemiology" is the subject.

"The Public Milk Supply and the Public Health," by Dr. M. E. Barnes. This occupies all of the July-Sept., 1933, issue of *Iowa Public Health*, Des Moines, Ia.

"Health Education Program of the W. K. Kellogg Foundation," by Lulu St. Clair. *Michigan Nurse*, Lansing, Mich. Nov., 1933. 20 cents.

"Mark Time" is New Jersey's talking character who discusses in homely, realistic fashion the practical workings of public health laws and regulations. In *Public Health News*, State Dept. of Health, Trenton.

"Inspector Brown" is one of the chatty individuals who discusses public health problems with the "Health Officer" in *Jamaica Public Health*, Central Board of Health, Kingston. In Nov., 1933, Inspector Brown reports on opposition to wrapped bread:

One bakery manager says: "that if the bread is wrapped at the bakery immediately after it is baked, the baker's assistant places

it on the rack to cool, then later it is passed out to the delivery man who places it in his wagon, then it is taken to the shop where it is handled at least two more times on being placed on the shopkeeper's shelves; when all this is done and the shopkeeper delivers it to the homes, the paper in which the bread is wrapped will have become so dirty that the lady of the house will refuse to have it."

CONTESTS

Ohio newspaper women, meeting in annual convention in October, awarded prizes for "the best collection of Christmas health seal sale stories in a paper of less than 25,000 circulation," and for the same in a paper of more than 25,000 circulation.

Winners in the radio sketch contest are announced in *Public Health Nursing*, 450 7th Ave., New York, N. Y. Dec., 1933. The winning sketch, "Inspiration," by Mary R. Young, is published in full.

The Ohio Public Health Assn. is repeating its awards for Christmas seal editorials. \$50 for the best editorial in a daily paper; \$50 for the best in a weekly; \$25 for the 2nd best.

Prizes are offered for descriptions or models of "improvised equipment made from materials obtainable in or by the average home, for use in home nursing care, demonstrations, health education in home, school, industry or clinic. . . . We are particularly eager to see *health education* material included in this contest."

Contest closes Feb. 20, 1934. See full particulars in *Public Health Nursing*, 450-7th Ave., New York. Nov., 1933. 25 cents.

NEW

Canadian Health, Canadian Social Hygiene Council, 105 Bond St., Toronto, Ont. "Devoted to the promotion of personal and community health." Quarterly. 50 cents per year. Sample free.

HONORABLE MENTION

To New York State Department of Health: for an annual report with both "contents" and "index," and for a chapter reporting "Public Health Education."

DEPRESSION

Almost a depression issue is the Oct., 1933, number of *Quarterly Bulletin*, Milbank Memorial Fund, 40 Wall St., New York, N. Y. The contents include: "Health and the Depression," by Edgar Sydenstricker; "Sickness and the Depression," by Perrott and Collins; "Nutrition and the Depression," by Kiser and Stix; "Diets of Low-Income Families in New York City," by D. G. Wiehl.

"Crisis in the Hospitals," by Mary Ross. *Survey Graphic*. July, 1933. 30 cents. "In private hospitals, empty beds, . . . In public hospitals, beds in the aisles . . . Ways out."

"Dollars and Lives," by C.-E. A. Winslow. *Survey Graphic*, 112 East 19th St., New York. Aug., 1933. 30 cents. "The drive to cut public-health budgets . . . parsimony and sometimes medical politics lie behind . . ."

"Health and the Tax Dollar." *Public Health*, Dept. of Health, Newark, N. J. Sept., 1933. An appeal based on findings of A.P.H.A.

"The War on Depression," by Glenn Frank. *Bulletin*, American Hospital Assn., Chicago, Ill. Oct., 1933. Includes "The Heroism of the Hospitals." "Somewhere the problem of bringing medical service into a rational relation to the buying power of the rank and file of Americans will have to be solved." A limited number of free copies.

"School Lunches Prove Their Value," a group of three papers. *Journal of Home Economics*, 101 East 20th St., Baltimore, Md. Nov., 1933. 30 cents. Partly depression values—and more.

"How to Cook Salt Pork," a broadside prepared by Bureau of Home Economics, Dept. of Agriculture, Washington, D. C., copies of which are to be supplied to families receiving salt pork through relief agencies.

HEALTH EDUCATION

The following references appeared in recent issues of *Library Index*, National Health Council, 450 7th Ave., New York (sample free):

"The Importance of Health Education," by W. M. Lloyd, M.B., D.P.H. *Medical Officer* (London). 50:142-43, Sept. 30, 1933.

"The Teaching of Social Hygiene in Schools by Means of the Film," by Lucien Viborel. *International Review of Educational Cinematography* (Rome). 5:596-99, Sept., 1933.

"The High School Health Council in Action," by E. H. Hastings, Jr. *Journal of Health and Physical Education* (Ann Arbor, Mich.). 4:3-6, 55, Oct., 1933.

"Unit Teaching in Health Education in the Secondary Schools," by J. V. Latimer. *Journal of Health and Physical Education* (Ann Arbor, Mich.). 4:10-12, 56, Oct., 1933.

"School Lunches Prove Their Value." *Journal of Home Economics* (Baltimore). 25:755-62, Nov., 1933. "Correlating Class Activities and Community Needs with the School Lunch," by L. A. Williams; "A School Coöperative Cafeteria," by M. B. Stover; "The First Penny Lunch," by Albertina Bechmann.

"Teaching Health in School Cafeterias." Baltimore's poster program. *Trained Nurse and Hospital Review* (New York City). 91:334-36, Oct., 1933.

"Song of the Vitamins," by A. M. Baker. *Journal of Health and Physical Education* (Ann Arbor, Mich.). 4:47-48, Oct., 1933.

"Public Health Education," by D.

V. Curry, M.D. *Health Officers' World* (Milwaukee, Wis.). 1:6-7, July-Oct., 1933.

"Administrative Methods in Health Education," by A. M. Kerr, M.D. *Journal of Health and Physical Education* (Ann Arbor, Mich.). 4:14-16, 59-60, Nov., 1933.

EDUCATIONAL AND REFERENCE

Under this heading we hope to mention new publications and new lists of publications and other available materials useful in health education, free or for a named price, throughout either or both the United States and Canada. Not all of the national agencies send in their new material.

Material from commercial sources is listed for your information.

When reprints are sent please state if copies will be supplied free or for a specified cost. This information about all publications is desired so that extra correspondence by interested people may be avoided.

Comment, for or against any materials, is most welcome, either for publication or for the confidential use of the editor of this department.

"Just Suppose . . ." is a small 12-page booklet issued by the Cancer Control Committee, Dept. of Health, New Haven, Conn. The cover is one of the best. From the bottom of the page arise in solid dark green the ragged mountain peaks representing New Haven's cancer death rate for 20 years. The title appears in white letters across the solid green. The rough finish paper and leaded type give a readable appearance to the inside pages.

"Cancer Control" is an inexpensive looking sheet, printed on one side, with a "Cancer Can Be Cured" statement in a box near the top. Most of the space is filled with case records headed, "Cancer of Cheek," "Cancer of Lips," etc. Each case is presented concisely

under "History," "Examination," "Treatment," "Result," "Operation," "Result." Probably used with a carefully selected audience. Also issued by Cancer Control Committee of New Haven Dept. of Health.

New York State Dept. of Health, Albany, has reproduced two Children's Bureau folders. "Sunlight for Babies" was multigraphed, and "Minimum Standards of Prenatal Care" was multi-lithed. The second is the new offset adaptation of the multigraph. Readers of the folders would not distinguish the type from printing. These folders illustrate a good grade of publication produced without benefit of the public printer.

"Smallpox and diphtheria—Both Can Be Prevented." Distributed by City Health Dept., Baltimore, Md. The control of smallpox used to illustrate practicability of diphtheria control.

"A List of References on the Care of the Mother Before the Baby Comes—And Afterwards," and "Child Health References for Parents." Reprint from *Child Health Bulletin*, Sept. and Nov., 1933. 4 pages. *Single copies free.* American Child Health Association, 450 7th Ave., New York, N. Y.

"Cleansing and Disinfection." New York State Dept. of Health, Albany. 7 pages.

State Charities Aid Assn., 105 East 22d St., New York (3 cents each):

"Up to Now," by Homer Folks. Health progress in New York. 9 pages.

"For the Next Decade," by Dr. James Alexander Miller. Control of tuberculosis.

"The Contributions of Health Insurance to the Tuberculosis Movement in England," by Dr. G. F. McCleary, British Ministry of Health. 4 pages.

"Common Interests between the Control of Tuberculosis and Syphilis," by Dr. Thomas Parran, Jr. 4 pages.

"The State's Interest in the Control of Tuberculosis," by Governor H. H. Lehman. 6 pages.

BOOKS AND REPORTS

Pathogenic Microorganisms — A Practical Manual for Students, Physicians and Health Officers—By William H. Park, M.D., and Anna W. Williams, M.D. (10th ed. rev.) Philadelphia: Lea and Febiger, 1933. 867 pp. Price, \$7.00.

A book which has reached its 10th edition has won its place in public esteem. There is no question that this work has been well received everywhere and stands today as one of the very best which can be given to students in medical schools. In the 10th edition numerous additions have been made, such as are necessary in a rapidly advancing science like microbiology. Indeed, the new methods and discoveries come with a rapidity that is almost bewildering.

This edition has full accounts of active immunization against diphtheria and scarlet fever. More of these immunizations have been done among the school children in New York than in any other part of the world, and we naturally turn to New York for information on the subject. Therefore, it seems unfortunate that the book is not up to date concerning one of the most important advances along this line which have been made. We refer to the alum precipitated toxoid, for which in this country we are indebted chiefly to the studies of the late Dr. Leon C. Havens, of the State Board of Health of Alabama, described in this *Journal*, June, 1932. A single dose only is required, and reports from various sources indicate that it is preferable to the two dose method heretofore largely practised. From the standpoint of administration, it certainly has great advantages over two or more doses. The

authors also cling to the "antigenic unit" obtained by flocculation, though the National Institute of Health does not recognize this as official, and prefers the animal test.

A number of changes have also been made in the chapters on Pyogenic Cocci and Pneumococci, though it is too much to say that this puzzling group of organisms has been made entirely clear.

The authors still persist in using "B.C.G." to describe Calmette's vaccine. The initials come from Bacille Calmette-Guérin, and Calmette has always used BCG. Certainly the punctuation given cannot be justified in view of its derivation.

There are too many misprints, most of which are not confusing, but some which may mislead a student. On page 512, "antiformin" is spoken of as an "alkaline hydrochloride solution," though elsewhere it is correctly given.

The book is also not up to date on some nomenclature. In the 8th edition there was a rearrangement of the grouping of organisms to conform more closely to the classification adopted by the Society of American Bacteriologists. This has been adhered to, but the most recent nomenclature has not been employed in all cases. On page 457, the dysentery group is classed under Genus *Eberthella*, whereas *Shigella* has now supplanted the older term.

The statement that "we believe" the credit for isolating the first bovine bacillus from a child belongs to Ravenel is still maintained. The correct statement is that Ravenel was the first to isolate the bovine bacillus from a child and prove its pathogenicity by inoculation of cattle, according to the method suggested by Koch. In other words, it

was the first scientific proof ever given of the danger of bovine tuberculosis to human beings, though many had believed in it and adduced clinical evidence of such infection. There does not seem to be any reason for the authors saying "we believe," etc. The literature is open to them and the matter is easily proved one way or the other.

Apart from the errors mentioned, the book is admirably printed and made up, and the illustrations good and sufficient. It can be recommended without hesitation for student use.

MAZYCK P. RAVENEL

The Science of Radiology—Edited by Otto Glasser. Springfield, Ill.: Thomas, 1933. Price, \$6.00.

This book, edited by Otto Glasser, is a product of 26 contributors, all well known in the field of radiology. It begins with a history of Röntgen and his discovery; next the story of Pierre and Marie Curie, and then a chapter on American Pioneers in Radiology. The following chapters consider the progress of science, physics, general apparatus, tubes, screens, dosage, etc., after which come the diagnostic features and therapy. Radium is considered in practically the same order.

A chapter is devoted to the biological effects of X-ray and radium, and another chapter to the nature of Cosmic rays and the Gurwitsch rays. Although each chapter is complete in itself, there is appended a list of references which add to their value. The early chapters on the history and biological effects would alone make the book worth while. The chapter on Industrial Radiology is very interesting for those in this field of work. Another chapter is on Radiologic Societies and Literature, in which all workers will find much of interest and value.

All those who are interested in X-ray or radium from the scientific as well as

the practical standpoints will find this book of the utmost value, covering, as it does, these subjects in an interesting and practical way. Indeed, there is no other book that we know of which covers the field as this does. The names of the contributors vouch for the scientific character of the articles, in addition to which, it is vouched for by the American Congress of Radiology, which chose the members of the Executive Council who have been particularly interested with Dr. Byron H. Jackson, Chairman of the Committee on History and Education, in the production of this book.

It is impossible to speak too highly of the printing and make-up of the book. It might well be called a deluxe edition, and if the reputation of Charles C. Thomas were not already so well established, this book alone would give him a high place. The illustrations are abundant and excellent.

DUDLEY A. ROBNETT

Iowa White House Conference on Child Health and Protection—Planning Commission, Iowa White House Conference, Des Moines, Iowa, 1932. 506 pp. Price, \$1.95.

This is a very comprehensive report of the proceedings of the Iowa White House Conference on Child Health and Protection, Des Moines, Iowa, April 14 and 15, 1932.

The volume should be of value not only to those interested in a study of child welfare, but especially to Iowa citizens who wish to know what is going on in their state in the interests of children.

The report, which is accurate and authentic, is divided into 4 sections: Medical Service; Public Health Service and Administration; Education and Training; The Handicapped.

At the end of each report there is an interesting summary or conclusion. The reviewer cannot begin to enumerate

the interesting conclusions reached in the various fields of child welfare endeavor as carried on in Iowa. The volume must be read to secure this information. ELDRED V. THIEHOFF

Maternal Mortality in New York City—By the *New York Academy of Medicine Committee on Public Health Relations*. New York: Commonwealth Fund, 1933. 312 pp. Price, \$2.00.

There have been during the last few years a number of studies of maternal and infant mortality. These inquiries have more often been carried out as part of health department programs or under legislative mandate. The investigation under review, on the contrary, was carried out by the medical profession itself and this is as it should be. Only an organized group of medical men can evaluate properly the medical factors in the maternal mortality and, more important still, make the necessary criticism of medical practice.

The piece of work under discussion deals with maternal deaths in New York City, being a study of all puerperal deaths in that city during the years 1930 to 1932, classification of the facts discovered and drawing conclusions therefrom. These objectives have been pursued, apparently, with much care and intelligence as might have been expected from the group sponsoring and executing the study.

In a brief review one can only indicate some of the important points of the book with a view to interesting the reader to dip into the volume itself. In the first place, there is a statement of the problem and here we find the assertion made that the figures "show no decrease in the puerperal death rate over a period of 10 years in the country, the state, or the city of New York." This statement, to my way of thinking, has to be borne in mind always in read-

ing the report since it supplies a touchstone to apply to both the data and the conclusions.

From the point of view of the public health worker, chapter 3, dealing with preventability of death, shares the center of interest with chapter 9—conclusions and recommendations. Other chapters deal with puerperal and extra-
puerperal causes of death; various factors affecting puerperal mortality; hospital practice; attendant at delivery; and midwife practice. At the end of the book are the tables upon which the whole is built.

In judging the preventability of death, the committee has used as its criterion "the best possible skill, both in diagnosis and treatment, which the community could make available." This is a flexible standard, as worded, and rightly so. A preventable death in New York City may be a non-preventable death in Plum Hollow, 50 miles from a specialist in obstetrics. On the above basis, the committee estimates that 65.8 per cent of the deaths they studied in New York City were preventable. (It is interesting to compare this figure with that of 39 per cent which was the estimate of a special legislative commission studying maternal deaths in Massachusetts in 1920.) Then, the New York committee tries to allocate the blame for the preventable deaths and charges the medical man with 61.1 per cent, the patient with 36.7 per cent, and the midwife with 2.2 per cent. As for factors entering into this rate, we find overuse of anesthesia, operative delivery, cesarian section, and hospital delivery. The midwife comes in for a word of praise; the committee feels that she has her place in obstetrical practice.

Another angle of this report which should be touched on here is that of the prenatal care these puerperal cases had received. Of a total of 1,538 women dying of puerperal causes ex-

clusive of abortion and ectopic gestation, a little more than 39 per cent are said to have had adequate prenatal care. (Incidentally these seems to be a discrepancy between Table 71 on page 167 and that on page 229 due to the exclusion of 26 cases.) Again compare these figures with those of another Massachusetts study (1922 and 1923) where only 11 per cent were found to have had adequate prenatal care.

If space permitted, it would be interesting to discuss the conclusions and recommendations of the committee, but every student of maternal mortality should read them for himself. They touch on such familiar subjects as lay ignorance and misinformation; failure of the attendant to give proper care; too ready operative interference, especially cesarian section; inadequate hospital standards; insufficiently trained midwives. The recommendations naturally have to do with the correction of the above mentioned weaknesses in medical practice. The report closes with the statement: "The hazards of childbirth in New York City are greater than they need be. Responsibility for reducing them rests with the medical profession."

This is a most timely and valuable study. Yet even after an investigation as thorough as this, one is left with the feeling that much of maternal mortality is still unexplained. Here is our largest city, with the best available in medical, nursing, and hospital care; with licensed midwives; with systematic effort constantly being made to inform the public; yet the maternal mortality for the city—as established by this survey—was 5.98 in 1932 as compared with 5.33 in 1920 (the latter according to the official figures); practically no change in 12 years. Furthermore, more than 39 per cent of those who died from puerperal causes are said to have had adequate prenatal care. Many

rural communities with a fraction of these facilities for treatment and with little prenatal care given can show as good or better rates. I find it hard to believe that "meddlesome midwifery" is the whole answer, since that factor is not confined to the city. There seem to be a factor or factors not yet fully appreciated. Might one suggest to the committee that an additional study of a series of pregnancies which did *not* result in death might throw light on the puzzle. MERRILL E. CHAMPION

The Great Doctors. A Biographical History of Medicine—By Henry E. Sigerist. New York: Norton, 1933. 436 pp. Price, \$4.00.

The first edition of this book was written in Germany in 1933. Since coming to America, a chapter entitled "William Osler" has been added. This is evidently a peg on which to hang a very sketchy and imperfect account of American medicine, and to praise the medical faculty of Johns Hopkins University of which the author is now a member. This chapter begins: "The New World, America, entered the medical stage!" When did this occur, and what did Dr. Osler have to do with it, since it goes back to 1677? He mentions the names and accomplishments of several men who have been prominent in American Medicine, like McDowell, Beaumont, Marion Sims, Drake, and Oliver Wendell Holmes.

The book contains too many half-truths to be regarded as a reliable history. It is well known that when the medical faculty of Johns Hopkins University was organized in 1893, four of its members were graduates of the University of Michigan, and two were on its faculty; yet the University of Michigan is not even mentioned, though many believe that it was in the Medical School there, under Victor C. Vaughan, that the great reform in medical teaching in the United States

began. Welsh is spoken of as a pupil of Ludwig and Cohnheim; Mall worked with His and Ludwig; Abel was a pupil of Schmiedeberg, though Welsh got his beginning in this country, and Mall and Abel were both graduates of the University of Michigan, from which they evidently derived their initial inspiration. What reason have we to think that studying under German professors, on which stress is laid, not only for those mentioned but in regard to others, was what made them great?

Among other half-truths is the claim, without discussion, that Nicolaier discovered the tetanus bacillus and Fränkel the pneumococcus. We know that Nicolaier produced tetanus by inoculation of garden earth, but if he saw the bacillus, he did not give a description of it by which it is recognizable at present. He described in the lesions, cocci and a number of bacilli. Rosenbach, in 1886, was the first to describe the drumstick forms which are so characteristic, and in the same year, Flügge described terminal oval spores. It was isolated in pure culture first by Kitasato in 1889. In regard to the pneumococcus, it is well established that it was seen by Pasteur and by Sternberg, both in the same year. The work which established its relation to pneumonia was carried out by a number of men, among whom Fränkel was one. The type of reasoning adopted by the author would attribute the discovery of the diphtheria bacillus to Klebs, who undoubtedly saw it in the membrane and described it before Loeffler grew it, and the discovery of the pneumococcus to Pasteur and Sternberg.

Another half-truth, if indeed it is at all true, lies in ascribing the discovery of ether as an anesthetic to Morton, who is said to have been the first to induce ether anesthesia. It has been proved repeatedly that the credit is due to Dr. Long, of Georgia. The author might well have consulted his col-

league, Dr. Welsh and Dr. Young, on this point. It is true that there is a controversy over it, but the dates show clearly priority for Long, though publicity was due to Morton. The witty reply of Oliver Wendell Holmes, when asked to whom credit should be given, "To e(i)ther," may be recalled.

An author certainly has the right to pick his subjects. Professor Sigerist recognizes that he has left out many worthy men, but as he states particularly that the book is written for the practising physician and his labors, we feel that we have a right to criticise the omission of Louis, who first introduced the Numerical Method, and who revolutionized the teaching of medicine as well as the study of cases. Dr. Osler is our authority for this statement, though we believe that it is universally acknowledged. In this connection, we wonder if Professor Sigerist has read *Some Aspects of American Medical Bibliography*, by William Osler (1902). This gives a much better idea of medicine in America than what he has said, though it makes no pretense of being a complete history.

The book starts with Imhotep and Aesculapius and carries us on down through the centuries, giving a brief account of many of the well known surgeons, physicians, and laboratory men to whom we owe so much.

The illustrations are numerous and excellent. The printing and binding are also excellent, though there are some errors, such as Nikolaier in the text and Nikolaer in the index.

In spite of mistakes in diction which will mislead the "non-expert" such as saying that Pasteur found a "remedy" for hydrophobia, and the half-truths which we have pointed out, the book can be heartily recommended for those who wish to know something about the great doctors included.

MAZÏCK P. RAVENEL

The Joy of Living. An Autobiography—*Dr. Franklin H. Martin*. New York: Doubleday, 1933. Vol. I, 491 pp. Vol. II, 526 pp. Price, \$7.00.

The story of the life of a distinguished physician who has lived in the interesting age of modern medicine, who has seen swept aside the false beliefs that have dominated sanitary science for so many centuries and who has contributed so generously, himself, to medical progress. Endowed with the rugged qualities and thrift of Dutch and Canadian grandparents, the author grew up during those stern and vigorous pioneer days in Wisconsin and Minnesota.

Accustomed to work from early boyhood, his advent into the field of medicine seemed quite by accident, but, once arrived, he soon became interested in the social and communal aspects of his profession and gave generously to

the advancement of educational and administrative services.

Through the publication of *Surgery, Gynecology and Obstetrics* and the creation of the "Clinical Congress of Surgeons" and the "American College of Surgeons," Dr. Martin has provided distinct contributions to the advancement of postgraduate teaching.

He played a prominent part in directing the medical and public health services of the military and civil populations of our country during the World War.

His autobiography will provide not only refreshing reading for those who seek relaxation in a life story well-told, but will serve the physician and public health worker as a valuable guide and reference book in the development of the sanitary science services, both scientific and administrative.

HENRY F. VAUGHAN

BOOKS RECEIVED

HEREDITY AND ENVIRONMENT. Studies in the Genesis of Psychological Characteristics. By Gladys C. Schwesinger. New York: Macmillan, 1933. Price, \$4.00.

ADOLESCENCE. LIFE'S SPRING CLEANING TIME. By Beverley R. Tucker. Boston: Stratford, 1933. 121 pp. Price, \$1.25.

GOOD EYES FOR LIFE. By Olive Grace Henderson and Hugh Grant Rowell. New York: Appleton, 1933. 202 pp. Price, \$2.00.

NURSING HISTORY. By Minnie Goodnow. 5th ed. Philadelphia: Saunders, 1933. 517 pp. Price, \$2.00.

FOOD-BORNE INFECTIONS AND INTOXICATIONS. By Fred Wilbur Tanner. Champaign, Ill.: Twin City Printing Co., 1933. 439 pp. Price, \$5.50.

MOTION PICTURES AND YOUTH: A SUMMARY. By W. W. Charters. New York: Macmillan, 1933. 102 pp. Price, \$1.50.

MYSTERY, MAGIC AND MEDICINE. The Rise of Medicine from Superstition to Science. By Howard W. Haggard. New York: Doubleday, 1933. 192 pp. Price, \$1.00.

SAFETY IN PHYSICAL EDUCATION IN SECONDARY SCHOOLS. By Frank S. Lloyd. New York: National Bureau of Casualty and Surety Underwriters, 1933. 167 pp. Price, \$1.25.

MISS GAY'S ADVENTURES IN FIRST AID. By Margaret Daly Hopkins. New York: Nation Press, 1933. 60 pp. Price, \$15.

AN OUTLINE OF IMMUNITY. By W. W. C. Topley. Baltimore: Wood, 1933. 416 pp. Price, \$6.00.

THE JOY OF LIVING. An Autobiography. By Dr. Franklin H. Martin. New York: Doubleday, 1933. Vol. I, 491 pp. Vol. II, 526 pp. Price, \$7.00.

THE HUMAN PROBLEMS OF AN INDUSTRIAL CIVILIZATION. By Elton Mayo. New York: Macmillan, 1933. 194 pp. Price, \$2.00.

HYGIENE OF THE MIND. By Baron Ernst von Feuchtersleben. New York: Macmillan, 1933. 150 pp. Price, \$1.25.

RED MEDICINE. Socialized Health in Soviet Russia. By Sir Arthur Newsholme and John A. Kingsbury. New York: Doubleday, 1933. 324 pp. Price, \$2.50.

GREAT MEN IN SCIENCE. A History of Scientific Progress. By Philipp Lenard. New York: Macmillan, 1933. 389 pp. Price, \$3.00.

DIET AND PERSONALITY. Fitting Food to Type and Environment. By Dr. L. Jean Bogert. New York: Macmillan, 1933. 223 pp. Price, \$2.00.

A SELECTED PUBLIC HEALTH BIBLIOGRAPHY
WITH ANNOTATIONS

Early Care of Defective Teeth—Coining the descriptive term "dental cripples," this article is a plea to the pediatrician (and the nurse should be included) to watch for defective dentures and to get the cripples early under the care of orthodontists.

BONIX, C. P. What the Pediatrician Can Do for Dental Cripples. *New Eng. J. Med.* 209, 18:875 (Nov. 2), 1933.

Amebic Dysentery—Information is given about amebic dysentery, the Chicago outbreak, and what has been done to control the spread of infection, all of which will be useful in answering the questions that popular interest is likely to arouse.

BUNDESEN, H. N., *et al.* The Health Hazard of Amebic Dysentery. *J.A.M.A.* 101, 21:1636 (Nov. 18), 1933.

Collateral Values of the Health Examination—How the health examination, if adequately followed up, may become the agency for establishing a continuing close relationship between the patient and his family doctor is the point of this discussion of examination methods.

CRAMPTON, C. W. The Health Examination, Life Service, and the Family Doctor. *New York State J. Med.* 33, 20:1216 (Oct. 15), 1933.

Sun Spots and Weather—Though sun spot cycles cause solar changes insufficiently pronounced to affect human affairs appreciably, they are sometimes great enough to appear extensively in the growth of trees, so we learn from an exceedingly detailed research.

DOUGLAS, A. E. Tree Growth and Climatic Changes. *Sci. Month.* Dec., 1933, p. 481.

How We Catch Colds—Just when we are comfortably assured by convincing studies that people may con-

veniently be grouped in relation to the number of colds they enjoy per annum, along comes this research which shows by mathematical computations, much too involved for this particular brain to follow, that catching cold is a mere matter of chance. Further, one may conclude that stability of resistance to colds is not characteristic if the sample populations studied are representative.

GAPAFER, W. M. and DOULL, J. A. Stability of Resistance to the Common Cold. *Am. J. Hyg.* 18, 3:712 (Nov.), 1933.

How Dangerous Is Unwrapped Bread?—In this series of papers the sanitary aspects of wrapping bread before delivery are thoroughly aired. One discussant had the temerity to suggest that those who were so concerned by the grave health menace of unwrapped bread seemed to forget the greater menace of contamination from unwrapped salads, fruit and vegetables eaten raw, but his remarks were scornfully ignored by the viewers-with-alarm.

LAMPIT, L. H., *et al.* The Relation of Wrapping Papers to Food, Etc. *J. Roy. San. Inst.* 54, 5:239 (Nov.), 1933.

Supervising British Midwives—One quotation is sufficient to indicate the practical level of this discussion of the increasing importance of the British midwife who delivers 3 to 4 out of every 5 women, and who is held by some British obstetricians to be the proper person to undertake the normal case. Here is the quotation: "It is true that sometimes the objection of the patient and her relatives to the prospect of a retinue of inspectors, health visitors and supervisors has to be overcome, and possibly the midwife herself may wish to avoid the possibility of earning the handicapping reputation of being 'fussy.'" Seldom does one see such

practical common sense seep into our American dissertations.

MACLEAN, E. The Rôle of the Midwife in National Maternity Service. *J. State Med.* 41, 11:643 (Nov.), 1933.

Studies on Encephalitis—Virus of encephalitis (St. Louis outbreak) was carried successfully through five passages in rhesus monkeys but could not be transferred successfully through mice, rabbits, or cebus monkeys, indicating that *herpes* virus did not play an etiological rôle in the St. Louis epidemic.

MUCKENFUSS, R. S., *et al.* Encephalitis: Studies on Experimental Transmission. *Pub. Health Rep.* 48, 44:1341 (Nov. 3), 1933.

Experience With BCG—These are important findings: "BCG is so attenuated that even under the most favorable conditions of artificial cultivation it is difficult to increase its virulence to any degree. . . . We do not think that the slight primary tuberculous infection . . . produced by vaccination diminishes resistance. . . . Children of tuberculous families vaccinated orally with BCG show lower mortality from tuberculosis than corresponding controls. . . . The allergy produced by BCG apparently does not usually last for more than two or three years."

PARK, W. H., *et al.* Effect of Vaccination With BCG on Children from Tuberculous Families. *J.A.M.A.* 101, 21:1619 (Nov. 18), 1933.

Persuading Venereal Patients—In a city of more than 100,000 population a social hygiene educational campaign of a month's duration was carried out to determine its effect on medical treatment. Physicians reported 58 more new cases (an 80 per cent increase) than the previous month directly attributable to the campaign; other less tangible benefits are also claimed.

PINNEY, J. B. Social Hygiene Education

in a City of Medium Size. *J. Social Hyg.* 19, 8:415 (Nov.), 1933.

Tuberculosis Among Italians and Jews—A study of 373 Italian and Jewish families registered with the Phipps Institute leads to the conclusion that the type of infection differed in the two races. Among the Italians the disease attacked a younger group and was more quickly fatal than among the Jews. Jewish morbidity rates were higher than Italian but mortality rates were lower.

PUTNAM, P. *The Bionomics of Families Attending a Tuberculosis Dispensary.* *Am. Rev. Tuberc.* 28, 5:537 (Nov.), 1933.

Aluminum's Non-Existent Dangers—We thought the last gun had been fired in the battle about the supposed dangers of aluminum, but here is another research which concludes that aluminum is not cumulative in the tissues and no harmful results may be expected from soluble aluminum occurring in foods or introduced by utensils.

SCHWARTZ, E. W., *et al.* The Extent of the Retention of Ingested Aluminum. *J.A.M.A.* 101, 22:1722 (Nov. 25), 1933.

Gloomy Gonorrhea Statistics—From a survey of 16 communities in 1927, it was estimated that there were 474,000 cases of gonorrhea constantly under treatment in the United States. Three years later a resurvey indicated a decrease of 10–20 thousand cases, but the decrease is due to the failure of infected persons to seek medical treatment. It has been estimated that there are 679,000 fresh gonorrheal infections each year.

USLITON, L. J. Trend of Cases of Gonorrhea Under Treatment or Observation in the United States. *New Eng. J. Med.* 209, 20:996 (Nov. 16), 1933.

Why Eskimos Are Diphtheria Immune—Finding Eskimos immune to diphtheria, though with no evidence of

having ever been infected, led to the assumption of the "maturation immunity" theory. In the latest study here reported *C. diphtheriae* were found to be present in the throat flora of the Eskimos. This warrants the belief that carriers do exist, and that the immunity discovered is specific. Thus the original "maturation" theory is invalidated.

WELLS, J. R. The Origin of Immunity to Diphtheria in Central and Polar Eskimos. *Am. J. Hyg.* 18, 3:629 (Nov.), 1933.

Rural Prosperity and Health—Despite the fact that other studies show high mortality associated with low economic status, this exceedingly thorough and inclusive statistical analysis of cer-

tain rural groups finds that when indices of urbanization are held constant, the correlation between prosperity and mortality disappears. A fine example of what may be done with our largely neglected gold mines of statistics.

WU, C. K., and WINSLOW, C.-E. A. Mortality, Prosperity and Urbanization in United States Counties. *Am. J. Hyg.* 18, 3:37 (Nov.), 1933.

Newer Milks for Babies—Vitamin D milk's advantages in infant feeding are that it is the most palatable form of administering the antirachitic factor; its disadvantage is that it costs more than milk plus cod liver oil.

WYMAN, E. T. Vitamin D Milk. *New Eng. J. Med.* 209, 18:889 (Nov. 2), 1933.

NEWS FROM THE FIELD

Southern Medical Association Resolutions

AT the recent meeting of the Southern Medical Association held in Richmond, the following resolutions were passed:

WHEREAS, investigations reveal information that nutritional deficiency is constantly assuming a more important rôle as the etiological factor of many diseases that have heretofore not been understood, and it is now known that there are present in the United States a great many diseases belonging to this group, some of which diseases are widespread, increasing in number, and are seriously undermining the health and vitality of the people of this country, and,

WHEREAS, we have little definite knowledge of the chemistry of our foods, because analyses which have been made in order to determine their nutritional value have been local or sectional and no sustained effort has been made upon a broad scale to supply such information as is necessary in order to determine the localities from which our food supply should be drawn, and,

WHEREAS, it is known that in certain localities and under certain circumstances, the

chemical elements of common foods, such as milk, fruits, vegetables, and cereals, show marked differences in value, while it is known that in other localities, certain vegetables absorb poisonous substances which render them of doubtful food value, and,

WHEREAS, no real progress can be made in the solution of nutritional deficiency diseases until chemical analyses of foods are made upon a broad and impartial scale and the relationships of the different chemical elements studied with scientific care, and

WHEREAS, the whole scientific world is aroused to the importance of this fundamental work in order that grave public health problems and the vitality and strength of the people of this nation be safeguarded; therefore be it,

RESOLVED, that the Federal authorities be urged to undertake this work upon a broad, comprehensive, and impartial scale in collaboration with selected medical colleges in the different sections of the country.

RESOLVED (2) that the Southern Medical Association urge that this work be undertaken at the earliest possible moment.

RESOLVED (3) that this association request the

coöperation of all other state and national medical associations in this country.

RESOLVED (4) that the Southern Medical Association appoint a committee whose purpose it shall be to confer with the national authorities at the earliest possible moment and urge them to proceed with the work.

There can be no question of the importance of this matter. Studies for the past 10 years have all pointed in the direction of the importance of proper nutrition, and our recent discoveries have shown scientifically the reasons. Many private laboratories are at work, and our government is at present paying attention to the subject in several divisions, but there is still need for extensive studies on the basis laid down in the resolutions.

DEATH OF ALFRED F. HESS

DR. Alfred Fabian Hess of New York City, well known pediatrician and research worker and a Fellow of the A.P.H.A., died suddenly of heart disease on December 5, 1933, at the age of 58. Dr. Hess was a pioneer investigator of scurvy and rickets and published noteworthy books on these subjects, and he also made important studies on tuberculosis, hemophilia, and gastrointestinal diseases. In 1924 he and Professor Harry Steenbock announced independently the discovery that ultra-violet light from the sun, or its artificial equivalent, would impart antirachitic qualities to certain foods. In recent years, Dr. Hess conducted many significant clinical investigations on vitamin D milks, the results of which have been published in leading scientific magazines, including the *American Journal of Public Health*.

Dr. Hess was a graduate of Harvard and received his medical degree from the College of Physicians and Surgeons of Columbia University. He was a member of many scientific societies and had received numerous well deserved honors.

NEW YORK CITY DIPHTHERIA IMMUNIZATION CAMPAIGN

THE New York City Health Department and the medical societies of the Bronx and Queensboro conducted an immunization campaign in September and October. Children of parents unable to pay were given free treatment at the baby health stations. The campaign marked the use for the first time in general practice of the new precipitated and redissolved toxoid, the Health Department reported. The regular toxoid, however, was used for older children.

NEW OFFICERS OF TEXAS PUBLIC HEALTH ASSOCIATION

THE Texas Public Health Association announces the following nominations for officers of the Association for the ensuing year:

Dr. T. J. McCammitt, President; Dr. E. F. Yeager, First Vice-President; Dr. J. H. Page, Second Vice-President; Jack Wyatt, Third Vice-President; Zula L. Powell, Fourth Vice-President; M. Pierson, Secretary.

ARIZONA STATE SANITARY DIVISION

IN the reorganization of the Arizona State Department of Health, a division of sanitary engineering has been established with the aid of the Rockefeller Foundation. F. Carlyle Roberts, Jr., of Tucson, has been named state sanitary engineer, and has begun a survey of water supplies in the state.

IOWA DIPHTHERIA IMMUNIZATION CAMPAIGN

PLANS have been announced for a campaign to immunize children of preschool and early school age in Davenport, Ia. Members of the Scott County Medical Society will coöperate, and children of parents unable to pay will be treated at the Scott County Clinic.

Albert Calmette and Emile Roux

ON October 29, Dr. Leon Charles Albert Calmette passed away at the age of 73. After serving in the French navy and with colonial troops, he founded and became the first Director of the Pasteur Institute at Saigon, French Indo-China. Later he became Director of the Pasteur Institute at Lille. During the World War he was shut up in that city, and his animals were sacrificed, so that he was unable to supply any of the antitoxins to the children of that part of France. Since 1917 he has been Sub-Director of the Pasteur Institute at Paris.

Although he did an enormous amount of work on the purification of water, venoms and sero-therapy against venoms, he is perhaps best known for his masterly researches on tuberculosis and the production of BCG with his associate Guérin. He received many honors, having been granted the degree of LL.D. from Cambridge and an Honorary Fellowship of the Royal Society. In France he was Commander of the Legion of Honor.

On November 3, Dr. Pierre Paul Emile Roux, Director of the Pasteur Institute and one of the best known of Pasteur's assistants, died at the age of 80. He made a notable record along many lines, having directly assisted in the experiments which ended in the production of vaccine against anthrax and also the Pasteur treatment against hydrophobia. He is perhaps best known for his work on diphtheria. With Yersin (1888) he was the first to observe paralysis in rabbits following inoculation with diphtheria. In 1889, again with Yersin, he was the first to prepare diphtheria toxin and to study the conditions under which it is produced. He held that toxicity was not to be confounded with virulence of the culture, since potent toxin could be obtained from slightly virulent organisms. In 1890 appeared the paper which pointed out the importance in diagnosis

of the finding of the diphtheria bacillus, and described in detail the technic which with some modification has been followed since.

These studies were largely responsible for the activity in research on diphtheria which followed. At the International Congress of Demography held at Budapest, in 1894, he read a notable paper written by himself and Martin, which unquestionably gave a remarkable impulse to the use of antitoxin throughout the world. Roux and his coworkers were the first to use horses for the production of antitoxin.

He was an intimate friend of von Behring, to whom the credit must be given for first producing diphtheria antitoxin, but both read their papers at the same Congress, and to Roux is often ascribed the discovery of diphtheria antitoxin, though erroneously, since Roux began his paper with a clear statement that the credit belonged to von Behring.

We can ill afford to lose such men, and all over the world are many thousands who will join with France in doing them honor.

PUBLIC HEALTH MEETING IN IOWA

THE Iowa Public Health Association conducted its eighth annual meeting on November 22, at Des Moines. Dr. James P. Leake, U. S. Public Health Service, Washington, D. C., delivered an address on "The Recent Outbreak of Epidemic Encephalitis in St. Louis."

ENCEPHALITIS REPORTABLE

THE Board of Health of Macon and Bibb Counties, Georgia, recently amended its regulation governing communicable disease to include encephalitis as a reportable disease. In the future, patients must be isolated and quarantined, while placards will be required on homes where the disease is present.

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Sickness Among the "Depression Poor" *†

G. ST. J. PERROTT AND SELWYN D. COLLINS, PH.D., F.A.P.H.A.

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Washington, D. C.*

THERE has been much speculation as to the effect of the economic depression on health, but no adequate index for evaluating its importance has been available. The usual barometer of health—or rather of ill health—is mortality. The general death rate and infant and tuberculosis mortality have declined during several years of severe economic stress to the lowest figures on record. This favorable situation has led some sanitarians to speculate as to the possible health benefits of the depression. They suggest that reduced excesses of eating and drinking and the lessened nervous tension that accompanies the quieter life of hard times, have actually improved health.

These interesting speculations are based on the number of people *dying* each year. Actually, mortality is a poor index of the health of the people. The death rate does not indicate the extent or nature of the 99 per cent of illnesses that are not fatal, or of physical im-

pairments such as malnutrition. Furthermore, an actual increase in mortality among the unemployed and their families could have taken place but have been entirely masked by the downward trend among the more prosperous elements of the population.

The purpose of the present study was to obtain at first hand a record of all types of illness among the families of the unemployed for comparison with similar data for the families of their employed neighbors. The information was secured by house-to-house canvasses of families in the poorer districts of industrial communities severely affected by unemployment.

METHOD AND SCOPE OF THE STUDY

The investigation obtained records of illness for a 3-month period in the late winter and early spring of 1933, and a 4-year income and employment record for each member of some 12,000 families in 10 localities. Eight large cities and 2 smaller industrial communities were canvassed. This paper includes preliminary data for 5 localities—Birmingham, Ala., Detroit, Mich., Greenville, S. C., Pittsburgh, Pa., and Syracuse, N. Y.

* Read before the Vital Statistics Section of the American Public Health Association at the Sixty-second Annual Meeting in Indianapolis, Ind., October 12, 1933.

† From the Office of Statistical Investigations, U. S. Public Health Service and the Division of Research, Milbank Memorial Fund.

Only the poorer parts of the localities were surveyed. Well-to-do sections and slum areas were avoided. The desired sample of the population was one in which unemployment was high at the time of the canvass but which was composed largely of individuals of the wage-earning class who were able and willing to work. Living side by side with these families of the unemployed, there were other families who, even in these poor districts, were still in reasonably comfortable circumstances, that is, had adequate food, clothing, and shelter. These "comfortable" families serve as a control group whose illness record can be compared with that of their less fortunate neighbors. In the selected districts every family was included un-

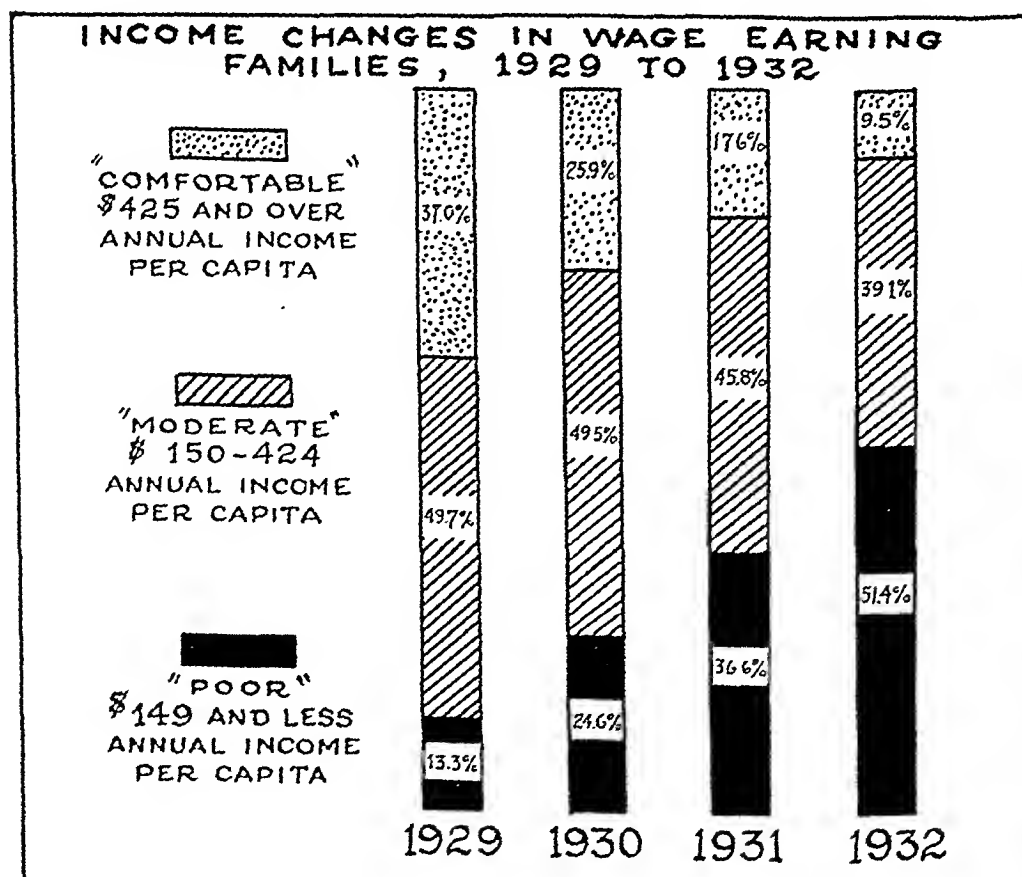
less the information was refused, and refusals were exceedingly rare.

Although the enumerators were hired locally, the canvass in each city was in immediate charge of a person trained in the collection and tabulation of such data, who was assigned from the permanent personnel of the U. S. Public Health Service or the Milbank Memorial Fund. Because of prevailing economic conditions it was possible to get exceptionally good enumerators; they canvassed families only after careful instruction and trial visits with the local supervisor.

All persons worked under uniform written instructions. Thoroughness rather than speed was encouraged in the enumerators.

FIGURE I

Percentage distribution of the surveyed population according to annual family income per capita for each of the years 1929-1932. The population includes 20,283 individuals in 4,421 families in Birmingham, Detroit, Greenville, Pittsburgh, and Syracuse.



THE POPULATION SURVEYED AND ITS ECONOMIC HISTORY

In the 5 localities included in this paper, about 6,000 white families were canvassed. Of these schedules, 4,421 were sufficiently detailed to permit computation of exact family incomes for each year from 1929 to 1932, and were reasonably complete in other respects also. A total of 20,283 individuals is included in these families.

The usual occupation of the chief wage earner in 1929 was skilled laborer in 66 per cent of the families; unskilled 16.5 per cent; clerical and salesmen 10 per cent; dealers, merchants, etc., 6 per cent; professional 1.5 per cent. In 1932, in 17 per cent of the families the chief wage earner was without employment throughout the year and 19 per cent had received public relief at some time during the year.

In nearly 58 per cent of the families, the head of the household was native white of native parents, in 11 per cent of foreign or mixed parents, and in 31 per cent foreign born. The racial stock of the group of foreign or mixed parents was largely English, Irish, and German, but the foreign born included also considerable numbers of Polish, Italian, and Slavic stocks.

Income as used in this study consists of all receipts from any source, including savings and borrowed funds used for living expenses and the value of food tickets in the case of families receiving such aid from welfare institutions. Family income per capita was used as the basis of classifying the households because this seems to describe economic status more accurately than the total income which takes no account of the size of the family. Figure I shows the population grouped according to annual per capita income for the years 1929 to 1932. For convenience in discussion, the individual income classes have been combined into 3 groups and designated as follows:

Poor—\$149 and less per capita per year
Moderate—\$150–\$424 per capita per year
Comfortable—\$425 and over per capita per year

These names have no significance other than as convenient labels indicating a rising scale of per capita income.

Figure I shows the tremendous reduction in income which took place in the surveyed population during the depression. The "poor" group (\$149 or less per capita) which constituted only 13 per cent of the total in 1929, was equal to 51 per cent in 1932, while the "comfortable" group (\$425 or more) dropped from 37 per cent of the total in 1929 to 9 per cent in 1932. The percentage in the "moderate" class (\$150–424) did not change greatly. This does not mean that individuals in this group in 1929 suffered no diminution in income during succeeding years, but that as some dropped into the low income group, others from the higher class took their places. Actually, over half of those in moderate circumstances in 1929 had fallen into the poor category by 1932. Nine out of 10 persons classified as "poor" in 1929 remained in that state throughout the 4 years. Very few persons enjoyed an increasing income during the depression and a very large percentage suffered a drop in income.

ILLNESS IN DIFFERENT ECONOMIC GROUPS

Inquiry was made about illness from all diseases and accidents, including mild as well as severe cases. What was included as illness was to a considerable extent a matter of what the informant (usually the housewife) remembered and designated as such. Hence the records of disabling cases are probably better measures of real sickness than the total cases, because disabling illnesses were more likely to be accurately and completely reported.

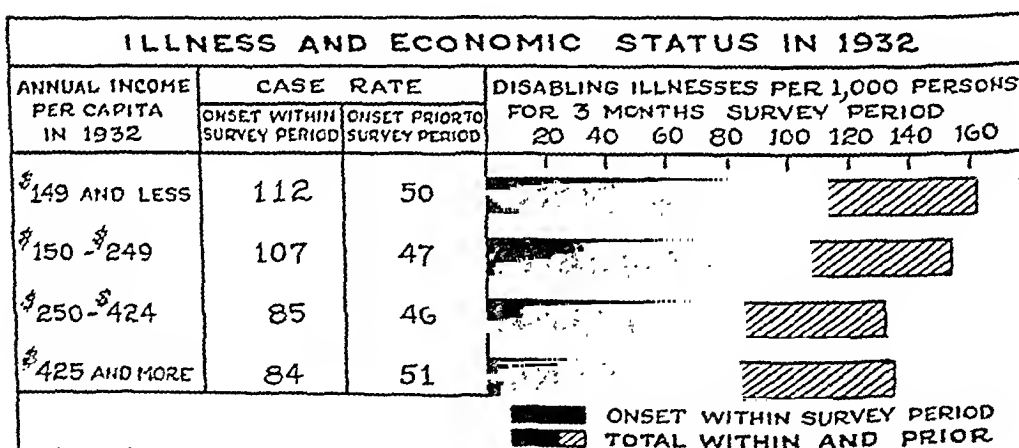
Illnesses are classified as having (1) onset within the survey period and (2) onset prior to the survey period. Each of these groups is shown as (a) all cases, (b) disabling cases, consisting of those causing inability to carry on usual activities, and (c) cases in which the patient was confined to bed for one or more days. All bed cases are included in the disabling class. In the present paper, disabling case rates have been used exclusively.

The illness rates are for the 3-month

time of the canvass. The illness rate is higher for the lower income groups, when illnesses with onset within the survey period are considered. Illnesses with onset prior to the period (largely chronic cases) show no definite relation to income. For illnesses within the survey period, the disabling case rate in the lowest income group (\$149 and less) is 33 per cent above that of the group with an annual per capita income of \$425 and over. The poor in the surveyed group are obviously subject to

FIGURE II

Disabling illness during a three months period in the early spring of 1933 in wage earning families classified according to income per capita in 1932, in five surveyed cities. (Number of persons observed: \$149 and less, 10,424; \$150-\$249, 4,569; \$250-\$424, 3,353; \$425 and over, 1,937. Total 20,283.)



period of the survey and are not reduced to an annual basis. The "survey period" refers to the 3 months prior to the enumerator's visit; it is the period of time for which illness data were recorded. The actual canvass in each city required from 3 to 4 weeks. The dates of the canvass varied in the different localities but were all between March 20 and May 15, 1933.

Illness and 1932 income—In Figure II the incidence of illness is shown for 4 groups of the surveyed population classified according to annual per capita income in 1932, to show the relation between illness in 1933 and economic status approximately as it existed at the

more illness than their more fortunate neighbors in relatively comfortable circumstances.

Illness and income change—Families in the various income classes experienced different economic histories during the depression. For example, of the 10,424 individuals who were classified as "poor" in 1932, 23 per cent were "poor" in 1929, 60 per cent were "moderate," and 17 per cent were "comfortable." A further analysis of the relation between "depression history" and illness was made. For this purpose the individuals were divided into 6 categories according to economic status in 1929 and 1932, as follows:

I. Individuals experiencing materially lowered family income per capita between 1929 and 1932 were classified:

1. Comfortable in 1929 and poor in 1932
2. Moderate in 1929 and poor in 1932
3. Comfortable in 1929 and moderate in 1932

II. Individuals who had not experienced materially lowered family income between 1929 and 1932 were classified:

1. Comfortable in 1929 and 1932
2. Moderate in 1929 and 1932
3. Poor in 1929 and 1932

showed an incidence of disabling illness that was 55 per cent higher than the rate (87 per 1,000) of their more fortunate neighbors who were equal in status in 1929 but suffered no drop in income by 1932, that is, the "comfortable in 1929 and 1932" group. The families which had dropped from comfortable to moderate showed a 10 per cent higher disabling illness rate than the above group that had experienced no drop in income. The group which had dropped from moderate to poor

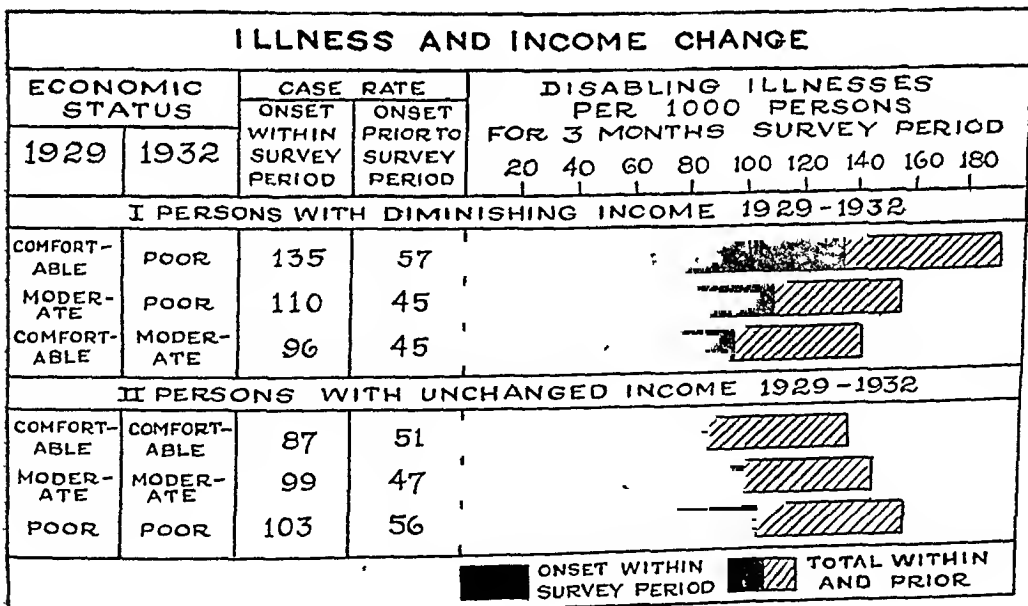
FIGURE III

Comfortable = \$425 and over per capita per year

Moderate = \$150-\$424 per capita per year

Poor = \$149 and less per capita per year

Disabling illness in wage earning families classified according to change in economic status, 1929-1932, in 5 surveyed cities. (Number of persons observed: Comfortable-poor, 1,772; Moderate-poor, 6,209; Comfortable-moderate, 3,919; Comfortable-comfortable, 1,818; Moderate-moderate, 3,761; Poor-poor, 2,443. Total, 19,922-361 persons with higher income in 1932 than in 1929 are omitted.)



Sickness data for these groups are given in Figure III. The highest illness rate is experienced by individuals whose fortunes have suffered the greatest change, namely, the group comfortable in 1929 and poor in 1932. This group with a rate of 135 per 1,000

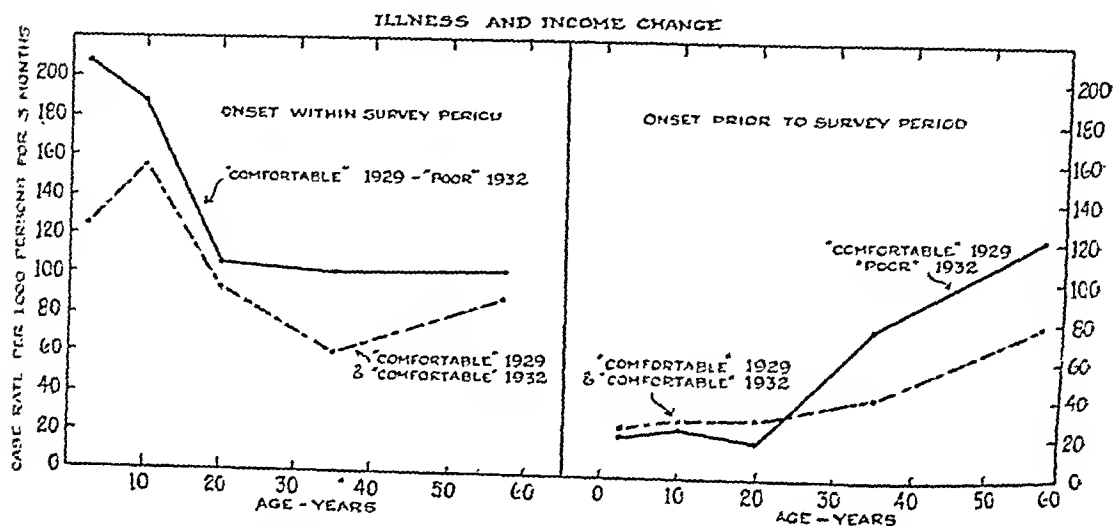
show an 11 per cent higher illness rate than those that were in moderate circumstances throughout the 4 years. It is interesting to note that the groups which may be designated as the "depression poor," that is, the "comfortable 1929-poor 1932," and "mod-

FIGURE IV

Comfortable = \$425 and over per capita per year

Poor = \$149 and less per capita per year

Disabling illness at specific ages in 5 surveyed cities in 2 groups of wage earning families, one which suffered a large decrease in income between 1929 and 1932 (comfortable 1929—poor 1932) and the other which maintained unchanged income (comfortable 1929 and 1932).



erate 1929—poor 1932,” have a higher illness rate than the “chronic poor,” i.e., “poor 1929—poor 1932.”

The same trends are observed for the total illnesses, onset within the survey period, and even the addition of the cases with onset prior to the survey period (largely chronic) does not obscure the fact that a relatively large drop in economic status appears to be associated with a high illness rate.

Figure IV shows the age-incidence of disabling illness in two groups, “comfortable 1929—poor 1932,” and “comfortable 1929—comfortable 1932.” It will be seen that for illnesses with onset within the survey period the “comfortable—poor” group shows a higher rate of illness than the “comfortable—comfortable” class in each of the 5 age groups used. The chronic illnesses appear to be slightly higher in the “comfortable—comfortable” group up to about 25 years. Above that age, the chronic cases, like the acute, are less in

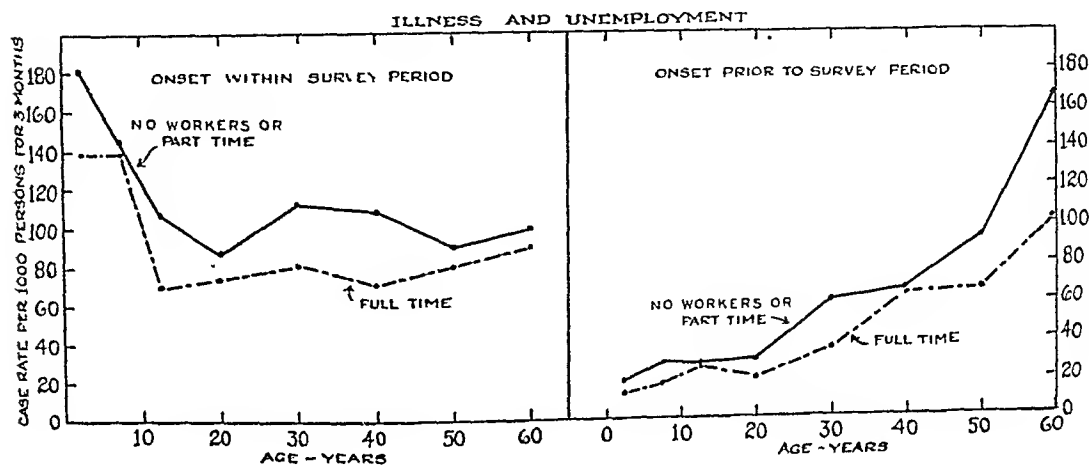
this group than in the “comfortable—poor” class.

Respiratory diseases account for the larger proportion of the difference in illness rate between the “depression poor” and their more fortunate neighbors. However, the differences are still evident in the group of non-respiratory diseases. The children of the “depression poor” show a higher incidence of respiratory diseases than the children of the families which were unaffected in economic status by the depression. This difference is not evident in the communicable diseases of childhood such as whooping cough, measles, mumps, etc.

Illness and unemployment—Since a high incidence of illness is associated with low income, it would be expected that families containing no employed workers or part-time workers only would show a higher illness rate than families having full-time workers. Figure V indicates that this is true at each

FIGURE V

Disabling illness at specific ages in 5 surveyed cities in families classified according to employment status of wage earners. Data for all ages: Unemployed or part-time: Onset within—116 per 1,000; Onset prior—53 per 1,000; Population, 11,785. Full-time: Onset within—88 per 1,000; Onset prior—42 per 1,000; Population, 8,498.



age and for both acute and chronic conditions.

SUMMARY

Records of illness in 1933 and economic history from 1929 to 1932 have been collected on over 12,000 families. The present paper presents preliminary results of the survey in 5 cities—Birmingham, Detroit, Greenville, Pittsburgh, and Syracuse. This group comprised 4,421 families and included 20,283 individuals.

The results show a higher incidence of disabling illness among individuals in the lower income classes in 1932 than among individuals with higher incomes. Illness is highest among a group of the "depression poor" which was in reasonably comfortable circumstances in 1929 but had dropped to comparative poverty by 1932; their rate is higher than that of their more fortunate

neighbors who suffered no drop in income and higher than the illness rate of the "chronic poor" who were in a condition of poverty even in 1929. Families containing only unemployed or part-time workers show a high incidence of disabling illness.

The writers have purposely refrained from drawing conclusions as to the broad significance of the findings. For example, no attempt has been made to estimate the number of the whole wage-earning population of the United States which has had a similar history to the group surveyed in the 5 localities. Nor is it possible to judge the seriousness of the situation indicated by the increased illness rates observed among the "depression poor" until the nature of the sickness is analyzed in more detail. Such interpretations must await more complete analysis of the entire volume of data collected.

The Growth of American Cities*

HOWARD WHIPPLE GREEN, F.A.P.H.A.

Secretary, Cleveland Health Council, Cleveland, Ohio

THE phenomenal growth of American cities is known to everyone. How New York City with a population of 49,401 in 1790 became a city of 6,930,446 inhabitants; Chicago with a population of 4,470 in 1840 within less than a century became a city of 3,376,438; and Philadelphia with a population of 28,522 in 1790 became a city of 1,950,961 inhabitants; Detroit with 1,422 in 1820 acquired enough people to make 1,568,622 in 1930; and Los Angeles with a population of 1,610 in 1850 in 80 years came to exceed 1 million, and to have a population of 1,238,048 is common knowledge.

It is not so well understood why Lynn, Mass., with 2,291 in 1790; New Bedford, Mass., with 3,313; Cambridge, Mass., with 2,115; Albany, N. Y., with 3,498; Norfolk, Va., with 2,959; Springfield, Mass., with 1,574; a total of 15,750 inhabitants for the 6 cities collectively in 1790 only had a population of 735,582 in 1930 while another 6 unheard-of places with no populations in 1790 had 9 million inhabitants in 1930.

Neither is it so clearly realized that Lowell, Mass., lost population between 1920 and 1930 as did Wilmington, Del., New Bedford and Fall River, Mass., and a multitude of other large American cities gained so small a number of inhabitants as to have no significance as indicating continuing growth.

For example, is Boston continuing to

increase in population when it had only 33,128 more in 1930 than in 1920 and changed from 748,060 to only 781,188?

With talk on all sides about the near approach of an ultimate maximum population for the United States, about our decentralizing industry and about the enormous effect upon population distribution which is being exerted by the automobile which provides a dependable mode of rapid transportation, one hardly knows whether or not to provide for larger and larger populations within metropolitan areas.

May decentralization of industry from within our large industrial centers be assumed to cause these centers to turn more to trade, finance, and transportation, in order to occupy their inhabitants? or may their populations be expected to decrease?

I shall not attempt to answer these questions in the space allotted to me, for what would be true for one place would be ridiculous for another. However, realizing that the provision of potable water and satisfactory disposal of sewage, to say nothing of the paving of streets, provision of gas, electricity, and telephone service, refuse disposal, transportation facilities, and a multitude of other important services, is a problem which must be faced months and years before the demand has arrived, I wish to consider with you some of the more basic factors of population growth.

If the City of Cleveland of 1830 had remained constant as far as its geographical boundaries were concerned, the population curve would show in-

* Read before the Public Health Engineering Section of the American Public Health Association at the Sixty-second Annual Meeting in Indianapolis, Ind., October 10, 1933.

creases from 1,076 in 1830, to 9,090 in 1870 and decreases from 9,090 in 1870, to 1,691 in 1930 and to far less than that population in 1933.

The City of Boston of 1840 would have shown an increase from 93,383 in 1840, to 178,086 in 1910 from which time it would have shown decreases to 148,040 in 1930. And the City of St. Louis in 1840 of 16,469 would have shown increases to 32,000 in 1870 and decreases since that time to a population of 5,634 in 1930.

In other words, these cities increased in population by annexing adjacent territory and the resultant increases may be credited more particularly to population accruing to the annexed territory.

For example, the most important annexations to Cleveland occurred between 1870 and 1880 during which period territory was annexed, having, in 1880, a population of 28,235 which by 1920 had increased to 295,822 and accounted for 37 per cent of the entire population of the city in that year.

So much for the growth of the total population of cities. I have already gone rather thoroughly into this subject in an article written for the *Engineering News-Record* of February 9, 1933.

The provisions of certain community services such as water purification, sewage disposal, garbage incineration, etc., are almost entirely dependent upon total populations. However, other similar services are only of use in the area in which they are located. For example, if an area of the city such as census tract J-1 in Cleveland is provided with sewer pipes of ample size for the 6,114 people inhabiting it in 1910, and its population decreased to 49 people in 1930, census tract T-8 which increased from 59 in 1910 to 10,577 in 1930, receives no benefit from the excess facilities in census tract J-1.

Such changes are going on in our

larger metropolitan communities all of the time. Careful studies of population trends should pay huge dividends in any large community.

The ability to prognosticate ultimate maximum populations is of considerable advantage in many instances, especially if determined for small geographical areas. Some approach has been made to supplying the necessary basic data for such studies in Cleveland through the "Real Property Inventory of the Cleveland Metropolitan District" in which data for 321 small geographically constant areas or census tracts have been made available.

As an illustration of the use of these data let us consider the City of Lakewood adjacent to Cleveland on the west. Lakewood in 1900 had a population of 3,355; in 1910, 15,181; in 1920, 41,732; and in 1930, 70,509. Lakewood was showing a steady and substantial increase in population and it might be prognosticated that a population of 100,000 more or less would be enumerated in 1940. However, the Real Property Inventory data of October, 1932, showed 20,572 family-units in Lakewood, 18,854 occupied and 1,718 vacant, in contrast to 19,635 occupied in April, 1930. It also showed that there were but 985 vacant lots and 25 acres of unallotted acreage. If it may be assumed that none of the area will be used for retail or for commercial enterprises and that each lot will ultimately be used for a single-family dwelling and each acre will provide 5 lots, it may be expected that only 1,110 additional family-units will be created. Thus a population of 78,000 living in 21,682 families may be assumed to be the ultimate maximum.

A study of the number of lots created each year, the number used for buildings, and the number of buildings demolished each year, aids in prognosticating population changes both immediate and ultimate.

These factors and scores of others must be taken into account when plans are made for public improvements. There is no use of providing wading pools when the population is too old to wade, schools when the child population is decreasing, or additional telephone conduits when the economic status of an area is declining. Our studies of the number of families with telephones show but 6.1 per cent of the families having telephones in the lowest economic area as contrasted to 99.5 per cent of the families in the highest economic area. In the lowest area 15.5 per cent of the families had a radio set and 14.4 per cent had one

or more personal automobiles in 1930 while in the highest economic area 87.4 per cent had a radio set and 93.2 per cent an automobile. The consumption of water and the volume of sewage to be carried away, may be expected to vary enormously with economic conditions.

I was originally asked to discuss the question: "Are cities likely to grow?" You can see that I have evaded the question very completely but in doing so I have attempted to present for your consideration some of the basic reasoning necessary to answer the more pertinent question: "Is a specific city likely to grow and if so how much and in what direction?"

New York Speech Center Broadens Activities

AFTER 16 years as an institution licensed by the New York State Board of Charities, the National Hospital for Speech Disorders has moved into its new quarters, 126 East 30th Street, New York.

This is the only institution of its kind, devoted solely to the cure of

speech defects, and devoted mainly to pathological conditions of voice and speech; the scope of activities is now to be broadened, however, to include special instruction in radio broadcasting, public speaking, dramatics and other features for normal speaking persons.

Keeping Up With the Demand for Adequate Pure Water*

HARRY E. JORDAN, F.A.P.H.A.

Filtration Engineer, Indianapolis Water Company, Indianapolis, Ind.

IN the consideration of this somewhat encyclopedic title, I shall confine the discussion to four major questions.

1. What is the probable trend of water demand among American cities?

2. What physical elements in public water supply need particular strengthening to meet this probable demand?

3. How does water works operating personnel measure up to its responsibility?

4. What may we assume to be the trend in water supply quality?

The trend of demand for water is dependent upon two factors—population growth, and variety or extent of water use.

1. There is beginning to be a reasonably wide appreciation of the fact that the United States is much nearer its population peak than was estimated a few years ago. This idea naturally must have underlying it the reservation that, just as Malthus' prophecy was upset by changes in the the industrial order, so also our present ideas as to living planes may be upset.

Assumption as to limits of population growth in the continental United States are predicated upon the maintenance of a scale of living and comfort—no lower—probably higher than at present obtains. Naturally, if some social catastrophe lowered the living standards now assumed to exist gen-

erally in this country, the capacity of the tillable areas to provide subsistence would permit a population density equal to that which obtains in certain Asiatic areas. We are all familiar with the population projection of Raymond Pearl which predicted the upper limit of the present cycle of growth at about the year 2100 with a total for the continental area of 197.274 million persons. This estimate was made before the implications of our national reversal of immigration policy were as much appreciated as they are now. The drastic change in this regard not only has reduced the annual increment of adult foreign population but has also affected the national birth rate.

The decade 1905-1915 witnessed annual net increments by immigration ranging from 400,000 to more than 800,000. In 1931 the admission-departure balance sheet evidenced a net departure of more than 10,000 persons. In addition to this a decline in births has been effective since 1924. The net result of these changes has led Thompson and Whelpton to set the upper limit of our present cycle of population growth to be reached in 1980 with a total of between 145 and 170 million persons. Taking the upper figure for purposes of this discussion, the estimated growth represents a 40 per cent increase over 1930 figures. It means naturally from a practical standpoint that some cities most favorably situated may double this rate of growth and that others in the +100,000 class

* Read before the Public Health Engineering Section of the American Public Health Association at the Sixty-second Annual Meeting in Indianapolis, Ind., October 10, 1933.

less favorably situated may show little or no growth. From an over-all water supply standpoint—upon the population basis alone—it appears rational for water supply authorities in cities where evidences of stasis or decay are not apparent, to cast about, within the next 25 years, for an ultimate increase in supply facilities from 40 to 60 per cent above present demands.

Influencing all matters of this sort, is the present national development in the direction of controlled capital investment. It is not in the least fanciful to assume that a material influence upon community and sectional growth may result from the changed emphasis upon capital input from the field of capital goods to producers' goods. We may also witness a more rapid decentralization of population masses under the influence of a social organization that limits the hours of employed labor and increases the hours of so-called leisure.

These influences upon urban growth cannot be estimated at the present time with any such degree of accuracy as to relate them directly to the questions in hand. Suffice it to say that the city with $\frac{1}{3}$ million inhabitants at the last census period should set its planning eye, not upon 1 million population as was the order of the day not so long ago, but upon $\frac{1}{2}$ million or thereabout.

In the category of varieties of water use, must be considered one factor that already has been placed upon its proper basis in most cities but which still in a few makes a rational approach to water supply problems well nigh impossible. To be exact, public water supply cannot be intelligently planned and administered unless the consumption is metered. It is an easy way out to say that citizens should have all the water they want to use, but such an attitude evidences a degree of naïveté unworthy of engineers, and more characteristic

of witch doctors. Human nature is a bit rawer than many wish to admit, and one way in which the old Adam breaks through is in the wilful and inconsiderate waste of water from unmetered supplies. Fortunately here again, the current limitation of capital input has a distinct bearing. The growth of consumer demand upon an unmetered supply brings a property to the point that it is not self liquidating. Conservation of present supply must ensue.

In cities where the supply is metered the present per capita demand ranges from 100 gallons per day in areas with a 35/45 inch annual rainfall to +150 gallons in semi-arid areas. But it appears that the demand even in the higher rainfall areas is increasing as equipment for lawn spraying is more widely sold and the development of pool and garden areas increases. Likewise there is a definite increase in the use of water for personal cleanliness, and we appear to be upon the verge of use of water for home air conditioning. Doubtless the latter will make no spectacular per capita increase in demand but it, along with other increasing uses of water, will influence total community demand materially.

2. What physical elements in public water supply need strengthening to meet current or future demands? Principally those relating to continuity and uniformity of service. The point may be better understood by reference to the improvements that have gone on in the electric utility field. Not so long ago it was not uncommon for voltage to drop noticeably under heavy load conditions and for current to fail completely for long periods after thunderstorms. Now a noticeable voltage variation in a sizable city is a rarity and even during the most severe electrical storm current interruptions are only momentary. It is this reliability of service that has led to increased use of current. Many of us depend upon the

mechanical regularity of electric current to operate our timepieces and check their accuracy by the radio announcement.

No such advance has been made in water supply practice. Too frequently it is assumed that peak loads or emergencies can be met by partial—often unreasonably inferior—service. It is difficult to justify such complaisance, especially in a city where service is metered. The greater the consumer demand, the greater should be the effort to render service. But it is in this phase of water supply practice that the greatest field for improvement lies. Most noticeable is the failure, even at present rating, to comply with the requirements of the National Board of Fire Underwriters. The following phrases from their rating *Manual* summarize the requirement adequately:

Reliable fire protection requires such duplication of all parts of a water system that with such parts out of service as may reasonably be expected to be inoperative, the system will still be able to furnish the required fire flow. The introduction of storage, either elevated and supplying the distribution system or for suction supply, offsets to a greater or less degree the need of duplication in various parts of a system, the value of the storage depending upon its amount and location; as affecting reliability of supply, it appears to be a reasonable assumption that a storage sufficient to provide fire flow for 10 hours during a period of 5 days of maximum consumption is sufficient to permit the making of most of the repairs, alterations or additions incident to the operation of a water supply system. . . .

Reliability of Pumping Capacity on which supply is dependent, shall be on the following basis:

Pumping capacity must be such, with the two largest pumps out of service, as to maintain maximum consumption and fire flow at required pressure. . . .

A water utility must produce a water meeting all hygienic requirements and having regularly a taste and odor which will produce a favorable consumer reaction. The supply must be adequate for all normal domestic and industrial

demands of the city; it must meet all demands for fire protection purposes and it must not be subject to restrictions or interruptions by drought on the one hand or floods on the other. We may reasonably demand that a water utility shall apply whatever lessons it may have learned from drought experiences in providing against a repetition of water shortage, and we may also demand that it protect the consumers against water shortage at times of flood, if in its history it has records of interruptions to service by reason of plant inundation.

The volume of available water is but one of several factors which must be analyzed in considering the necessity of plant extensions or alternate supplies. It is quite conceivable that a water utility might have at its command raw water sources materially greater than its maximum demand but of such quality that it was not a desirable source for purification. It is also conceivable that a water utility might have present sources of supply marginal as to quantity at time of drought, where the present evidence gained over the country in the 1930-1931 drought would indicate that it is dangerous to consumer comfort to use to the last drop a surface water for purification sources. We may also visualize a supply marginally adequate of a quality suitable for purification purposes, which has a sufficient record of interruption during flood periods to indicate the engineering wisdom of supplementing it with a separate and distinct source of supply not subject to flood interruptions.

We may also learn from the practices of other cities that when they reach a certain size and importance it is desirable to separate their water supply facilities into units of such size and distribution as to make possible at least a partial service from one source if the other is unavailable for a short period.

Such type of development has occurred in Cleveland, Detroit, St. Louis, Minneapolis, and Chicago. In these cases factors in production as well as distribution have led to the development of widely separated production layouts where it is still conceivable that production might have been developed from one point.

Volume of water is one factor in choice of water supply sources. Freedom from interruption by inundation is another. Separation of supply units for safety's sake is another. Degree of response to purification methods is another—all must be taken into account in developing a city's water supply sources.

In all engineering practice, it is common to protect against unforeseen matters by a factor of safety. What this factor or margin in terms of quantity should be is difficult to evaluate. The Chief Engineer of the New York City water supply has recently stated that it should not be less than 10 per cent of the available sources. In my opinion this factor should increase for cities of moderate size up to probably 25 or $33\frac{1}{3}$ per cent of the previously recorded minima. An incipient conflagration at the height of a dry period might be checked by that margin of safety, while a "let slide" policy would have exhausted that margin. It is easy to visualize "getting by," but cities have a way of not forgetting catastrophes.

3. In the attempts to meet the demand for adequate pure water, how does water works operating personnel measure up to its responsibility? Even in the phase of maintenance of safe quality, the record is not one in which we can take pride. Wolman and Gorman did a major service to the field of public health engineering when they made and published their study upon "The Significance of Water-Borne Typhoid Epidemics." Let us get into

the heart of it. In their summary of the factors responsible for all cases of water-borne typhoid fever and dysentery in the United States in the period 1920-1929, they ascribe 54.1 per cent of the total to "inadequate control over purification methods." Under this heading they include (a) inadequate control of filtration and allied treatment, (b) inadequate chlorination, when only treatment, (c) interruption of chlorination when only treatment.

It is not important that we at present go through the details of their analysis to see whether we agree with their allocation of the causes. Grant, if you wish, that they were wrong half the time and you are still compelled to charge against bad management of water works plants one-fourth of all the water-borne urban typhoid and dysentery in the United States. Either amount represents so great a failure as to be a tremendous indictment of our water works operating personnel. Why did this happen? What can be done to correct it?

One of the principal reasons for the happening is that our municipal authorities have treated minor (sometimes major) water works operating personnel as political spoils. The qualification for selection has not been "competence for water works operating duty," but "votes delivered in the precinct." Along with this has developed the condition that men in responsible positions in the department were not allowed sufficient authority to build up and maintain an efficient operating organization. Full administrative authority to employ or to discharge subordinates is a prime requisite for successful administration of a water purification plant.

The community that puts purification plant operating responsibility upon an individual and does not give him an organization plan that carries with it control of his subordinates is inviting a

water-borne epidemic as certainly as water flows downhill. I shall not forget the sadness in the face of one purification plant superintendent who said to me "I have no time any more for research—it takes all my time and energy to keep from being thrown into the political den of lions and to produce some sort of civilized routine out of this mess of ward hangers-on that I have been given to operate the plant."

Naturally along with improvement in minor personnel and their performances, goes the need for never-ending energy and search for improvement among those in responsible charge of operations. There comes to mind the sentences of Lewis Carroll in *Through the Looking Glass*:

"Well, in our country," said Alice, still panting a little, you'd generally get to somewhere else—if you ran very fast for a long time, as we've been doing."

"A slow sort of country!" said the Queen, "Now, here, you see it takes all the running you can do, to keep in the same place. If you want to get somewhere else, you must run at least twice as fast as that!"

Such is the life of a water plant executive—if he does his part to overcome the disgraceful record of water-borne typhoid during more than half the last decade, some dysentery also being ascribable to failure properly to control processes known to be effective in producing safe water supplies.

4. Finally—What may we assume to be the trend of demands for quality of water supply? A satisfactory water in present-day conception of the terms may be described as follows:

A water supply to be of high quality, should be clear; of neutral taste; of reasonable temperature; so balanced chemically that it neither dissolves materials excessively with which it comes in contact, nor deposits portions of its mineral content thereon; and neither produces unfavorable physiological effects nor contains organisms capable of producing intestinal infection.

Correlative to the expression as to finished water quality we may set a

statement as to the limiting characteristics of a source from which a public water supply should be derived:

A public water supply should not be produced from a source containing taste producing materials that cannot be removed by reasonable methods, whose temperature frequently exceeds that of the human body; so polluted by trade wastes or natural materials from the watershed as to contain an irremovable color or irremovable mineral salt of adverse physiological effect; nor so polluted by sewage as to preclude adequate purification by well known and practicable methods.

In meeting purification problems, the water supply engineer is at the mercy of a public (the same public that permits political control of its water works), far too often indifferent to the needs of adequate sewage treatment. The callousness with which one city destroys the recreational value of a stream for its own people and at the same time makes more difficult the water purification problems of its downstream neighbor confirms one in the orthodox opinion of the fallen nature of mankind.

By and large, the extreme zeal with which water plants have undertaken taste correction deserves tribute. Their energy is commendable, but we must not, in our enthusiasm for taste corrective treatment, forget that the need of such treatment results from the unreasonable overloading of the source stream with the waste products of other communities.

Fortunately — or unfortunately — as we may choose to view it, the approach to a density limit of sewage organisms in a raw water is definite. Various expressions of this have been made, but none so definite as that of Streeter at the close of his long series of studies of performance of purification plants. Whether or not one agrees with the reasoning, he at least must defend against the indictment the use of any raw water whose average *B. coli* content

exceeds 5,000 per 100 ml. It is reasonable to expect that in any future revision, the Treasury Standard limitations will not only be set as they are now upon the quality of finished waters, but also may be suggested as to limiting average *B. coli* index of raw waters.

It is difficult to visualize a rational objection to such development in the light of the experimental evidence at hand. My own organization has already admitted the validity of this opinion, by refusing to consider as satisfactory under drought conditions an emergency supply to be taken from a stream whose *B. coli* index is above the 5,000 average and into which a number of combined sewers may discharge within a 5 mile distance above the intake. In spite of the contention of our adversaries in a rate case that the supply could be considered useful under low flow conditions, our policy has been steadfastly to regard the supply as usable as a raw water source only as an emergency reserve. More cities than now care to admit it will face the issue either of obtaining more adequate purification of upstream sewage or supplementing their present sources with raw water that conforms to the approaching standards.

The overloaded stream is less likely to manifest its condition by a continuous ill-effect upon the public health of water users than it is, at time of sudden changes in flow to furnish a water non-responsive to purification processes which are generally adequate. Such conditions may be followed by those painful, brief, and generally non-serious intestinal outbursts which involve a very large proportion of the city's popu-

lation. We lack adequate data from the medical profession on the subject, although it is probable that they come into contact with only a small proportion of those affected. Certain recent research has indicated that staphylococcus and streptococcus filtrates experimentally produce intestinal disorders not dissimilar to those occurring in the Charleston, W. Va., epidemic of 1930. If this is substantiated by other observers, it becomes all the more definite that the stream with the high average *B. coli* density and the probable peak densities beyond the scope of purification processes may not be continued as a source of supply for a purification plant.

In brief, the task of keeping up with the demand for adequate pure water appears to forecast the following: The present cycle of national growth indicates an average ultimate increased demand upon water supply facilities 40 to 50 per cent above present normal demands with the usual allowance for peak and fire demands. Water supply works in general need to improve physical structures so as to effect regularity and adequacy of supply under peak demand conditions. Water works operating personnel generally suffers by reason of misuse of political patronage. Specifically, the recent record of purification plant failures distinctly challenges those in responsible positions to train themselves and their subordinates to a much higher degree of performance. Finally it is evident that a stricter limitation of raw water quality must force either improvement in stream loading conditions or the abandonment of unreasonably loaded sources of supply.

Liquid Wastes Their Treatment and Disposal*

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IN the past 30 years marked advances have been made in the treatment of liquid wastes of cities and industries, due to a better understanding of the principles of biochemistry and physical chemistry and their application to the sewage art. Further, the mechanization of the sewage works has progressed, both by design of special devices, and by adaptation of apparatus used in other fields. Such progress in the art however has probably been more helpful to the large installations than to the small. For a town of 10,000 population more or less the types of sewage works available have become more or less stabilized. The changes now occurring apply chiefly to the larger situations where economies in construction and operation show up more markedly because of the scale. More and more the yardstick of cost is being applied, because sewage disposal *per se* is always in the red and the object is to keep the losses as low as possible.

There is probably no installation in the United States or for that matter in the world, where sewage disposal makes an over-all profit. Possibly the City of Bradford, England, earned a return in one year during the World War which covered all annual charges.

Industrial waste treatment may prove a different story in some cases, such as the corn products industry, where the bottling up of wastes and recovery of the solids is said to have produced a considerable revenue. The use of save-alls in paper mills, and the recovery of fats, fertilizers, and other by-products in the meat packing industry, are examples of what has been accomplished at an earlier stage. But in many industries, treatment of the liquid wastes will probably be a charge against the manufactured product and not a source of income.

The demand for clean streams and for palatable water supplies free from tastes and odors is bringing home the need of greater care in the treatment of sewage and industrial wastes. An interesting example is the pollution of the southern end of Lake Michigan by the sewage and industries in Lake County, Ind. On one occasion, the wastes from the industries (including an oil refinery) were swept by windblown currents some 50 miles north, to produce unpleasant tastes in all the water supplies taken from that frontage.

What are some of the high points in progress in the art? To my mind, first comes the improved methods in laboratory procedure, enabling the sanitary engineer to study the problems better and to determine in advance the effect of what he proposes to do. The biochemical oxygen demand is a marked

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improvement over the old line methods—furnishing a yardstick of efficiency for processes as well as a means for testing stream purification. Likewise the introduction of pH control to the sanitary field has been a great aid in shedding light on many problems.

Next come the improvements in design made possible by the careful tests of many large works and operators generally throughout the world. Construction costs have been lowered through the combination of steel and concrete, and of the application of large scale construction methods. Not to be forgotten are the operating results, both in cost and efficiency, whereby the operators of sewage works are building up a mass of invaluable data.

The sewage art is divided now very definitely into two fields,—the treatment of the liquid and the treatment of the solid. In the last 10 years the treatment of the liquid has attained more stability, and the treatment of the solid, the sludge problem, has been advancing.

In the treatment of the liquid, the activated sludge process stands out, disclosed to the public by Ardern and Lockett, April 3, 1914. The revival of interest in chemical precipitation has awakened the old discussion of the relative merits of biological and chemical processes. Little that is really novel has been brought forward, unless it be in the Guggenheim process where zeolite is used to remove free ammonia after chemical precipitation. Dr. Mohlman will discuss the subject of chemical precipitation later. All I wish to emphasize is that there is still much to be learned from the lessons of the past. There are physical, bio-chemical and chemical laws which work. While a knowledge of pH control may help understanding and operation, it is not a panacea. A yardstick of performance is available in the BOD test. With the tools at hand the sanitary engineer

will gradually determine what the efficiency is of each process, and rate it accordingly.

In the handling of solids many interesting lines have been developing. Practice, however, until recently, stopped short of one final goal, an inert mass free of all organic matter. The Imhoff tank and separate digestion stimulated by heat, have worked well in many situations. Likewise the development of mechanical means for cleaning air-drying sludge beds, and the use of glass covers have been helpful. The application of vacuum filters to dewatering properly conditioned digested sludge has been another step—Whether raw sludge can be so handled and dumped with impunity is still in doubt. However, fresh and activated sludges generally contain considerable amounts of heat units per pound of dry solids. After dewatering on a vacuum filter with the aid of a conditioner, the resulting cake may be dried and burned, with relatively small additions of fuel. The residue is inert, and practically free from organic matter. The possibilities of this procedure are being tested on a relatively large scale by the Sanitary District of Chicago, with two 25-ton dry solids installations. Such a procedure may eliminate both sludge digestion and air drying beds and make appreciable reductions in first and operating costs on a complete plant—using preliminary settling and activated sludge.

Progress has been made in the sludge disposal field. Milwaukee is an example in commercial marketing of heat-dried activated sludge as fertilizer. Smaller cities, like Grand Rapids or Dayton, are marketing heat-dried digested sludge locally. Baltimore gives away to truck farmers all its sludge as removed from the drying beds. The material has value as humus and as a fertilizer according to the type.

Much has been learned of the effect on the stream of an effluent. Where the

dilution is low, there is need of investigation to determine what secondary nuisances may arise from plant growths. Again, where combined sewers are in service, the problem of storm water control or treatment is coming to the fore in situations where some years back the question did not arise.

The coöperation of the engineer, chemist, and biologist is bearing fruit. Organizations like the New Jersey Sewage Experiment Station, the U. S. Public Health Service, the Sanitary District of Chicago, Baltimore, Milwaukee, and the Sanitary District of

Indianapolis are aiding in collecting knowledge and making facts available for general use.

As the art progresses, the opportunity for a great improvement grows less, but there is still opportunity for betterment. Sanitary science provides means which can be adapted to many situations. For the large concentrations of population the sanitary engineer is now concerned with the adaptation of new or special methods, particularly where savings in cost and betterments in results may be accomplished because of the size of the problem.

Can Refuse Collection and Disposal Systems Be Improved?*

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IT is possible to look forward with a feeling of considerable hope to an improvement in the administration of those of our municipal utilities in which operation is based primarily on engineering principles. Among such may be included our refuse collection and disposal services. While in many of our cities this work is done today with efficiency and economy and a proper appreciation of the engineering principles involved, nevertheless in many of our cities and towns it is believed that these principles are not thoroughly appreciated. With the tremendous increase in the number of our technical uni-

versity graduates and technological unemployment it is probable that many more technically educated engineers will participate in the routine operating services of our cities.

A substantial improvement may be obtained in cities which adopt a service charge against the householder, for the operation of the collection and disposal works, particularly if the money so received is ear-marked for the sole use of the refuse collection and disposal department. In this way this department may become independent of the appropriating power of the city government and thereby may have funds available for proper maintenance of equipment and increase in plant when this may become necessary.

While many directors and employees

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now are competent, experienced men, there often is room for substantial improvement by rigid adherence to the policy of basing all appointments solely on merit.

There is substantial room for improvement in design of our refuse disposal works. Improvements in design will tend first toward greater life of the equipment; better provision will be given to withstanding the resistance to operating conditions which cause deterioration; operating conditions will be simplified and improved. Already substantial advance has been made in this direction. With the purchasing of disposal works, based on the engineering merits of the design, a great forward step will be taken.

The greatest single advance in refuse disposal will come in improvements in operation. When the engineering principles involved are properly appreciated, incinerators for example will be operated at a uniform rate throughout the day, rather than at a high rate for a short time, followed by complete cessation of operation. Alternate heating and cooling of the refractories permits periods of low temperature operation during which combustion may not be satisfactory, and sudden temperature changes cause rapid expansion and contraction of materials and rapid deterioration of the plant in general. Basing the capacity of a plant on 24-hour operation instead of 8-hour operation, permits a great decrease in the capital invested and in the fixed charges per ton of material disposed of.

Greater attention should be given to the maintenance of cleanliness about disposal works. While this seems trite, there can be no question that rigid cleanliness in a plant dealing with material of this nature in such tremendous volumes will result (1) in a much higher morale among the operating staff; (2) a coincident improvement in the care given the physical equipment with

a corresponding increase in its life; (3) more efficient operation because of the pride taken in the work; (4) greater respect for the operation of the department, among the public and the city officials who appropriate the funds required for operation. This will make it possible to secure the funds needed more easily than with careless methods of operation.

So far we have dealt only with the disposal system. The collection system is an entirely different function, but susceptible to great improvement due to the same basic factors. There is a tremendous variation in the type of equipment used for this service, thus calling for sound engineering study of the requirements of the city in selecting suitable equipment. There is apparently a greater tendency to assume that European methods are superior to ours in the field of refuse collection than in any of the other municipal services with which public health engineers customarily deal. While much has been said of the difference between the material collected in Europe and in this country, I doubt if this difference is always appreciated, and little is said of the difference in wage rates in Europe and in this country. Both of these factors should be given serious consideration in comparing foreign practice with home practice.

Possibly the greatest single opportunity for improvement in collection services lies in studying the various problems which arise, *on a unit basis* such as the work done in cubic yards, tons, man-hours, vehicle-hours, and ultimately in dollars per unit, rather than by reasoning in generalities from a comparison of the total costs of one city with those of another. Probably there are no two cities where the per capita cost of an equally efficient service using identical equipment would be the same, due to the many variable features in the problem, such as different street

layouts in the two cities, different topography, different operating personnel, and many other features.

There is no question that the efficient operation of a refuse collection service demands the driving energy of a practical man. In the larger cities there should be available the services of a trained engineer to gage the unit cost of the work and its efficiency and to make changes in district and route boundaries from time to time, as these become advisable from the standpoint of economy.

Recently we have heard a great deal regarding technological unemployment and a shorter working day. Weeks ago industry signed the President's Unemployment Agreement, called the "blanket code," but our municipalities in general have not joined the NRA. If we look back a generation we will find that our municipalities and government services in general have been the leaders in shortening working hours, and that industry has followed along behind, but has come into step after some delay.

In some cities the refuse collection service offers an example in regard to the use of a shorter working day in municipal activities. For many years in cities where the 8-hour day is required by law it has been rather common practice to divide the work of the city among the collection crews so that each crew has its daily stint. In stormy weather and during peak seasons each crew is required to clean up its district, regardless of the number of hours demanded, without additional compensation for any overtime which might be required. This is offset, however, by

the practice of placing the men "on their own" and releasing them when the work is done. In this way it has been found that in some of our better organized collection services the men frequently finish a reasonable 8-hour day's work in considerably less than 8 hours. The dispatch with which the men work under these conditions, always assuming that thoroughness is insisted upon, brings about a better service at no additional cost to the tax payer.

In conclusion, the answer to the question asked in the title is "Yes." Refuse collection and disposal systems can be improved by placing the work in the hands of practical men and engineers; by taking the operation away from our boards of health, doctors and laymen, but leaving the privilege of making complaints against poor service to the boards of health; by making engineering studies of the work done by units of cost and work accomplished, rather than by comparing the work of one city with that of another.

The operating services of our municipalities can be improved and at the same time provide an outlet for the increasing number of graduates from our universities by diverting them from the construction or producing field into the operating or consuming field. If the country has reached the point economically where new construction or additional productive units are required to a lesser degree than in the past, some outlet such as this will be required for many of these technical men. A great hope for improvement in these systems lies in utilizing their trained services.

NOTE: See also *Mosquitoes Have No Place in the City*, by R. E. Tarbett, page 61, January, 1934, *Journal*; *The Practical Application of Milk Control*, by J. R. Jenner, page 155, this *Journal*; and *The Air We Breathe and the Sounds We Hear*, by Joel I. Connolly, to appear in March, 1934, *Journal*.

Examining Dairy Products for Members of the *Escherichia*-*Aerobacter* Group*

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A REVIVAL of interest in the significance of the presence of organisms of the *Escherichia*-*Aerobacter* group in several dairy products, has resulted in the proposal of a variety of methods for the detection and enumeration of these organisms. The solid media, such as Endo, bile salt and eosin-methylene-blue agars, and the liquid fermentation-tube media such as lactose broth, gentian violet bile, and brilliant-green bile, all appear to have their proponents. Unfortunately, little detailed information regarding the comparative value of these various media is available; and a recent survey of the methods and media presently used in laboratories and milk plants suggests that sufficient consideration is not always accorded certain essential requirements of the application of the routine colon test to such products. Our purpose is to discuss briefly some of the more important of these requirements and to detail the results obtained from a limited comparison of various methods of estimating the number of *Escherichia*-*Aerobacter* in milk.

It should be observed, at the outset, that the particular numerical range requirements of a colon test to be applied to a given product may at once eliminate from consideration certain media and certain methods. For example, evidence is accumulating that the num-

ber of colon organisms in properly pasteurized milk should be very low—not more than 10 or 20 per 100 c.c.—and the method of estimation employed should be adapted to numbers of this order of magnitude. This requirement immediately eliminates the possibility of using, practicably, any of the common plate media, since not more than 0.1 to 0.01 c.c. of milk can be plated in agar in the usual 100 mm. Petri dish. One colony on such a plate poured with 0.1 c.c. of sample is equivalent to 1,000 organisms per 100 c.c., whereas the laboratory is here interested in densities as low as 10 or less per 100 c.c. There is no doubt that the practice of plating comparatively infinitesimal portions of pasteurized milk for detection of colon organisms has served to delay desired progress in the control of pasteurization, for negative results with such plates have engendered a false sense of security on the part of those entrusted with the control. The use of fermentation-tubes and liquid media appears, at present, to be the only practical method for work of this character.

Another consideration which deserves special attention when applying a colon test to a given product is the quantitative possibilities of the method. As soon as the question of *number* of organisms enters the field, the equally important question of *precision* of the result obtained demands recognition. The error of simple

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sampling, to which all the usual methods of examination are subject, is so great that particular care must be exercised to choose a method which will yield fairly reliable results. It is perhaps not generally realized that, because of the chance distribution of the few colon organisms in the sample or dilution, no method commonly employed at present of which the authors are aware will yield results which are, with any fair degree of assurance, within 50 per cent of the true value.

This fact is brought out in Table I, which shows, approximately, the relative precisions obtainable from certain plate and fermentation-tube systems of examination. It is assumed that reasonable assurance is provided by odds of about 32 to 1, and the precisions were calculated by means of available formulae¹ on this basis. The precisions of various results obtained even from the same system may vary somewhat, so the figures given must be considered as merely rough approximations. It is to be noted that these precisions hold only when all conditions are favorable: dilutions properly chosen, samples and dilutions well shaken, and the simple error of sampling the only cause of error operating.

fully warranted, in view of the promise of convenience and precision of results which the plate method offers.

As the number of organisms in the sample becomes less than about 5 per unit of quantity plated, however, the precision of the plate count falls off rapidly, and completely negative plates become numerous. Two requirements of a plate method are, therefore: (1) It should preferably yield a count of 5 or more countable *Escherichia-Aerobacter* colonies, and (2) it should be so selective that these colonies may be fairly surely recognized.

On the other hand, even a moderately precise fermentation-tube method must include the use of at least 5 tubes with each dilution of sample. A larger number of tubes must be used if the precision of the result is to exceed that represented by the range of about one-third to four times the actual number of colon organisms present.

A third essential to reasonable accuracy in estimating the density of colon organisms in dairy products is the practice of duplicating the tests. It may seem unnecessary to stress the importance of checks in any bacteriological work, but the physical characteristics of many dairy products and the facili-

TABLE I
RELATIVE PRECISION OF RESULTS

System of Examination								<i>Odds are 32 to 1 that the most probable numbers obtained will fall within the range of approximately</i>							
2 tubes with each of 3 or more dilutions								30 to 1,000	per	cent	of	true	number		
5 " " " " 2 " " "								30 to 400	"	"	"	"	"		
10 " " " " 1 " " "								40 to 250	"	"	"	"	"		
Plate counts, when count is 5 to 10								20 to 200	"	"	"	"	"		
" " " " " 10 to 50								60 to 150	"	"	"	"	"		
" " " " " 50 to 100								75 to 120	"	"	"	"	"		

It is interesting to observe that one plate count of, say, 8 colonies is a result quite as reliable as that obtained from 10 fermentation-tubes. The numerous efforts directed toward the development of selective plate methods are evidently

ties for local, undistributed multiplication of bacteria which they offer render representative sampling a problem. Those familiar with milk-slide microscopic work appreciate the difficulty of sampling due to the frequent presence

TABLE II

COMPARATIVE COUNTS OF COLON ORGANISMS ON SOLID MEDIA *

Sample No.	Bile Salt	Endo	E M B
59	16	22	20
60	crowded	crowded	crowded
61	310	310	300
62	18	18	8
63	33	39	122 (32 + 90?)

* Counts given are the sum of the counts from 2 plates.

of masses of colon organisms which may be broken up by manipulation, such as that of pipetting. In consequence, the practice of relying upon the results from 1 plate only, or from 1 tube with 1 or more dilutions is not to be recommended. The use of several fermentation-tubes with each dilution provides an automatic check on the results; when the plate method is employed at least 2 plates should be prepared to provide a similar check.

PLATES VS. FERMENTATION-TUBES

Plate Methods—Plates and solid media offer certain advantages, as compared with fermentation-tubes, in the estimation of the number of colon organisms in dairy products, particularly when the sample contains a comparatively large number of these organisms. The advantage in precision of results obtained from the plate method has already been pointed out. Provided a readily prepared and really selective plate medium were available, the plating procedure would frequently be the method of choice.

The lack of selectivity of the solid media more commonly used for this purpose, however, constitutes a source of error which requires careful consideration when plates are employed. Kline,² for example, reports:

We have found another type of bacteria giving more or less typical "colon" reactions on Endo's media—an organism that gives a good "colon" reaction on the media, but does not possess the ability to ferment sugars with the production of gas, producing only

acid. . . . Sometimes these acid-forming but non-gas-producing organisms appear in quite large numbers as shown in Table VI covering a special study of six pasteurizing plants.

TABLE VI (in part) FROM KLINE

	Raw	Pasteurized
Samples	88	95
Cultures	260	65
Gas formers	174	25
Acid formers	86	40

It will be noticed that about half of the cultures examined by Kline in this special study failed to produce gas and therefore failed to conform to the usual definition of *Escherichia-Aerobacter* organisms.

Similarly, the authors, in a study of raw milks by the plate methods, found a great variation in the proportion of typical colonies which proved to be colon organisms when different samples were examined. The media employed were a special bile salt agar, Endo, and eosin-methylene-blue agar. The samples represented raw milks supplied by different dealers; 2 plates of each medium with 0.01 c.c. of sample in each, were poured. The results from a series of consecutive samples are shown in Table II.

It will be observed that the counts of typical colonies in the 3 media check fairly well. A number of colonies were fished from each plate into lactose broth; if gas appeared, a streak was made on eosin-methylene-blue agar and resulting growth completely confirmed

by the *Standard Methods of Water Analysis* of the A.P.H.A. Table III shows the results of this procedure.

attempted to use eosin-methylene-blue and several other agars in this way for examination of water, but with indif-

TABLE III
RESULTS OF CONFIRMATION OF COLONIES ON SOLID MEDIA *

Sample No.	Bile Salt	Endo	E M B	Total	Proportion
50	8/10	5/5	3/4	16/19	84%
60	7/10	—	1/4	8/14	57%
61	3/10	1/4	3/8	7/22	32%
62	0/10	0/3	0/5	0/18	0%
63	0/10	0/6	0/4	0/20	0%
Total	18/50	6/18	7/25	31/93	33%
Proportion	36%	33%	28%	33%	

* Denominator indicates number of colonies examined.
Numerator indicates number of colonies confirmed.

The colonies from samples Nos. 62 and 63 were similar to the majority of those from the other samples, yet not one of the 38 colonies fished from these 2 samples proved to be *Escherichia-Aerobacter*. Only 33 per cent of all the typical colonies from the 5 samples were confirmed as colon organisms. Other series of samples examined in the same manner, but employing only Endo agar, yielded similar results.

Evidently the so-called "typical colon colonies" appearing in these solid agar pour plates should not too hastily be accepted as colonies of *Escherichia-Aerobacter*. Since the proportion of such colonies proving to be of colon organisms will vary with different samples, it is essential that a number of the colonies from each sample be actually confirmed before the count can be taken as an indication of the number of *Escherichia-Aerobacter* contained in the sample.

A departure from the pour-plate method, involving the spreading over the surface of a dried agar plate a small quantity of sample and then again drying the plate before incubation, has been employed by some workers. The authors have no data to offer concerning the value of this method in milk examination. Some years ago they

ferent results because of the difficulty of recognizing *Escherichia-Aerobacter* colonies.

Fermentation-tube Methods—Many different media have been employed in fermentation-tubes for the estimation of the coli content of milk and other dairy products. Although published reports of comparative work with various media are few, there seems to be a consensus of opinion that ordinary plain lactose broth is unsuitable for this purpose. The experience of the authors with lactose broth for detection of colon organisms in milk has been very disappointing. Kessler and Swenarton³ reported that they tried and discarded plain lactose broth, and suggested that the failure of this medium was probably due to inhibition of colon organisms by the acidity rapidly produced by other types of bacteria present. They proposed a gentian violet-lactose-peptone bile for the test. With this medium over 99 per cent of positive presumptives (gas in 48 hrs. at 37° C.) were "partially confirmed," by production of typical colonies on eosin-methylene-blue agar streaked with material from the presumptive tube.

The authors have conducted a limited series of tests for the purpose of comparing gentian-violet bile with

brilliant-green bile 2 per cent Special, a medium commonly employed for water examination. It was thought that many laboratories might find it convenient to use the same medium for water and for milk. A total of 139 samples of bottled pasteurized milk was tested by placing each of 4 dilutions (1 c.c., 0.1 c.c., etc.) of the sample in 2 tubes of each medium and incubating at 37° C. for 48 hours. The results are given in Table IV. Of the 139 samples, 55 contributed one or more positives; in no instance were all the tubes planted from one sample positive.

almost a sure indication of the presence of colon group organisms. Since 86 per cent of the tubes with at least 10 per cent gas, when pasteurized milk was examined, were completely confirmed as colon group organisms, the production of gas in that amount may reasonably be considered an indication of the presence of these bacteria in routine work. Indeed, in pasteurization control, the experience of the authors indicates that gas in any amount is seldom formed from 10 ml. samples taken at the pasteurizer (when properly operated) and that, in consequence, any

TABLE IV
COMPARISON OF GENTIAN VIOLET BILE AND BRILLIANT GREEN BILE

Portions of milks tested	1 c.c.	0.1 c.c.	0.01 c.c.	0.001 c.c.
10% or more gas, 48 hrs.				
Tubes of gentian violet bile	51	31	22	8
Tubes of brilliant-green bile	61	39	23	9
Gas, but less than 10%, 48 hrs.				
Tubes of gentian violet bile	6	3	2	2
Tubes of brilliant-green bile	10	3	0	1

The results agree fairly closely, the brilliant-green bile yielding a somewhat larger number of positive presumptives, particularly with the lower dilutions. The more frequent failure of lower dilutions to yield gas in gentian bile when higher dilutions yielded gas accounted, in large part, for the fewer positives with this medium.

The series of comparative presumptives described above were not confirmed, but later another series of positive presumptive tubes of brilliant-green bile were confirmed with the results shown in Table V. The system of examination employed was that of planting 2 to 5 tubes with each of 4 dilutions, 1 c.c., 0.1 c.c., etc. All tubes with gas were subjected to the confirmation procedure.

It is evident from the results shown in Table V that when raw milk was tested in the manner described any amount of gas formed in the tube was

gas found in the majority of tubes containing such quantities of pasteurized milk usually indicates some fault in the processing of the milk.

It may be of interest to note that, in the course of the confirmation of the presumptives described above, the number of confirmations was increased by 11.5 per cent by fishing a second colony from the eosin-methylene-blue plate. Approximately the same proportional increase was obtained from raw as from pasteurized samples.

A recent tendency, here and abroad, is toward more rigid requirements, as regards colon group density, for pasteurized milk. In order to determine the practicability of testing quantities of milk larger than 1 c.c., a series of milk and cream samples (all pasteurized) were examined by planting two 10 c.c. quantities in brilliant-green bile tubes, the medium being of the special strength usually employed for 10 c.c.

TABLE V

RESULTS OF CONFIRMATION OF POSITIVE BRILLIANT-GREEN BILE PRESUMPTIVES

Pasteurized Milk: 54 samples (with positive presumptives) from
29 different pasteurized supplies.

	<i>10 Per Cent or More Gas in 48 Hrs.</i>	<i>Less than 10 Per Cent Gas in 48 Hrs.</i>
Number of presumptives	153	51
Number completely confirmed	132	23
Proportion completely confirmed	86%	45%

Raw Milk: 25 samples (with positive presumptives) from
20 different raw milk supplies.

Number presumptives	112	12
Number completely confirmed	111	11
Proportion completely confirmed	99%	92%

quantities of water (20 c.c. of medium in the tube; 60 gm. of dehydrated medium per liter). A total of 100 tubes from 53 different samples showing at least 10 per cent of gas after incubation for 48 hrs. at 37° C. were subjected to the completed confirmation procedure. Every one of these 100 tubes was confirmed as containing colon group organisms. Apparently 10 c.c. quantities of sample can be tested by means of brilliant-green bile with reasonable assurance that the formation of at least 10 per cent of gas in the fermentation-tube indicates the presence of organisms of this group.

The results here recorded indicate that brilliant-green bile constitutes a satisfactory medium for the routine estimation of the number of colon group organisms in milk. Although the number of presumptives examined was not large, they were obtained from a series of many hundreds of samples which were taken from many different milk supplies in various cities and towns and which were fairly representative of the general milk supply of the Province of Quebec. The representative character of these samples compensates, in some measure, for the limited number examined.

SUMMARY

The great variation in the numbers of *Escherichia-Aerobacter* organisms which may be found in milk and other dairy products necessitates careful discrimination in the choice of the routine method of estimation which is best adapted to the examination of the particular product under consideration. Three requirements which deserve special notice are:

1. The necessity of choosing a method which will permit enumeration in the range of numbers of organisms to be found in the sample. There is little advantage in testing 0.1 ml. of pasteurized milk by means of a plate method when such milk usually contains only a few colon organisms in 100 ml. of sample.
2. The necessity of choosing a method which will yield results of the desired precision. The error of simple sampling is such that, when the dilution-tube system is employed for routine work, at least 5 tubes should be planted with each dilution. It is pointed out that the count on a single satisfactorily differential plate with from 5 to 10 recognizable colon colonies is quite as precise as the result from 10 fermentation-tubes planted with the proper dilution of the sample. The search for differential plate methods for enumerating colon organisms is well warranted.
3. Whether plates or tubes are used, duplicates are advisable in order to detect gross errors in the results obtained.

Comparative results obtained from examination of milk samples for *Escherichia-Aerobacter* by various methods suggest the following tentative conclusions:

1. So-called "typical" colonies appearing in solid media pour-plates inoculated with milk may not be accepted as colonies of *Escherichia-Aerobacter* unless a sufficiently thorough examination of a large number of colonies from representative samples has proved that they may be so accepted. In the hands of the authors plates poured with neither Endo, bile salt, nor eosin-methylene-blue agar proved reliable for direct enumeration of colon organisms in milk samples, since the proportion of resulting typical colonies which were confirmed varied from zero in some samples to 100 per cent in others. It is quite probable that similar difficulties would be encountered in the examination of dairy products other than milk by these plate methods.

2. The production of 10 per cent or more gas in brilliant-green bile 2 per cent special fermentation-tubes inoculated with quantities of raw or pasteurized milk varying from 10 c.c. to 0.001 c.c. and incubated 48 hrs. at 37° C. provides reasonable assurance of the presence of *Escherichia-Aerobacter* organisms. This medium appears to be as reliable as gentian violet bile for the enumeration of these organisms, and is more conveniently em-

ployed in those laboratories where it is also used for examination of water samples. The percentage of such brilliant-green bile presumptives which were completely confirmed varied as follows:

Raw milk, 1 c.c. to 0.001 c.c.	99%
Pasteurized milk, 10 c.c.	100%
Pasteurized milk, 1 c.c. to 0.001 c.c.	86%

It is pointed out that since the organisms in 10 c.c. of properly pasteurized milk rarely produce gas in this medium, the production of any amount of gas from the majority of such samples of 10 c.c. or less of a pasteurized milk is usually indicative of some fault in the processing of the milk, either improper pasteurization or recontamination of the pasteurized product.

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Mother's Day—May 13

THE Maternity Center Association of New York announces its annual Mother's Day Campaign, and that Mother's Day this year is to be observed May 13. Those interested in

securing aid for local groups who wish to lower maternity mortality in their own communities may apply to Mrs. Shepard Krech, President, 1 East 57th Street, New York, N. Y.

Epidemiology of Lobar Pneumonia*

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IN a preliminary study one of us¹ determined the prevalence of various types of pneumococci in the nasopharynges of persons who had been in intimate contact with cases of lobar pneumonia. Nasopharyngeal cultures of over 1,000 persons (contacts and controls) indicated that Types I and II pneumococci were much more prevalent in the nasopharynges of immediate family contacts of cases of lobar pneumonia due to the homologous organisms than in the population at large. This suggested the advisability of further study in an attempt to determine the significance of this finding. Does the case of lobar pneumonia due to Type I or II pneumococcus infect his immediate contacts; or do these types invade the nasopharynges of a family, establish themselves and ultimately produce pneumonia in one unfortunate member? An answer to at least a part of this question might be reached by first taking cultures of the family contacts of an individual who had developed lobar pneumonia. One would then remove that person to a new uninfected environment, thus exposing a new, presumably susceptible and uninfected group of contacts, and make a study of this new group. Our approach to the problem was to restrict ourselves to a study of the contacts of cases of lobar pneu-

monia which were due to Type I or II pneumococcus and that were taken to the wards of general hospitals early in the course of the disease. We compared the nasopharyngeal content of the home contacts of each case with the nasopharyngeal content of hospital contacts of the same case.

The hospitals of Metropolitan Boston coöperated in the study and informed us immediately by telephone whenever a case of lobar pneumonia due to either Type I or Type II pneumococcus was admitted to their wards. Our procedure was to culture immediately the new environment of the patient; namely, the hospital patients adjoining the new case (if the case was in a large ward), or all the contacts, if the new case was placed in a small 4- or 5-bed ward. This enabled us to establish the nasopharyngeal flora present in the new environment at the time of the introduction of a source of Type I or II pneumococcus. These contacts were then re-cultured at intervals as long as the contact remained unbroken, and as long as the pneumonia patient continued to exhibit Type I or II pneumococci in his sputum.

The environment from which the patient had come was studied concurrently. The family from which the case had been removed was visited, and nasopharyngeal cultures were taken from as many of the immediate family contacts as possible.

As a further index of the extent to which Type I or II pneumococcus

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TABLE I

NASOPHARYNGEAL CULTURES ON HOSPITAL PATIENT AND FAMILY CONTACTS OF CASES OF LOBAR PNEUMONIA DUE TO TYPE I PNEUMOCOCCI

	Cases	Contacts	Contact Days	Negative	Positive and not Homologous	Positive and Homologous	Per Cent Positive and Homologous
Hospital Contacts	20	61	426	38	50	1	1.6
Family Contacts	17	62	153	13	34	15	24.2

strains are transmitted from acute cases to their contacts, house officers, nurses, and orderlies working on the wards in which lobar pneumonia caused by these types of pneumococcus were being treated were cultured. These cultures were taken before exposure to the case, during exposure, and at intervals after the exposure had ended.

Several families in which the incidence of homologous carriers was high were cultured at regular intervals to discover the length of time a "healthy" carrier was likely to carry a Type I or II pneumococcus.

Various factors of the environment which might influence the transfer of pneumococci from patient to contact, such as overcrowding, low economic or social status, were noted. Similarly, variations in the individual contacts, such as age, the existence of respiratory disease, or the occurrence of acute respiratory infection, chilling of the body by exposure, etc., received attention.

The pneumococci were identified by

standard mouse passage and tube agglutination technic as recommended by Cooper² whose specific sera from I to XXXII, inclusive, were employed. Our Type XX serum cross-agglutinated with so many types of pneumococci that it was used only occasionally, which probably accounts for our finding this type but once. The virulence to a mouse of each strain of pneumococcus that was isolated from a contact was determined. The technic and personnel for both this study and the one previously reported by Smillie¹ were the same, so that the results of the two are comparable.

The general study was continued through a 9 months period, November to July, inclusive.

FAMILY, PATIENT, AND HOSPITAL STAFF CONTACTS OF LOBAR PNEUMONIA DUE TO TYPE I OR II PNEUMOCOCCUS

The contacts of 64 cases were studied. Of these 64 cases, Type I was the infecting organism 42 times, and Type II, 22 times.

TABLE II

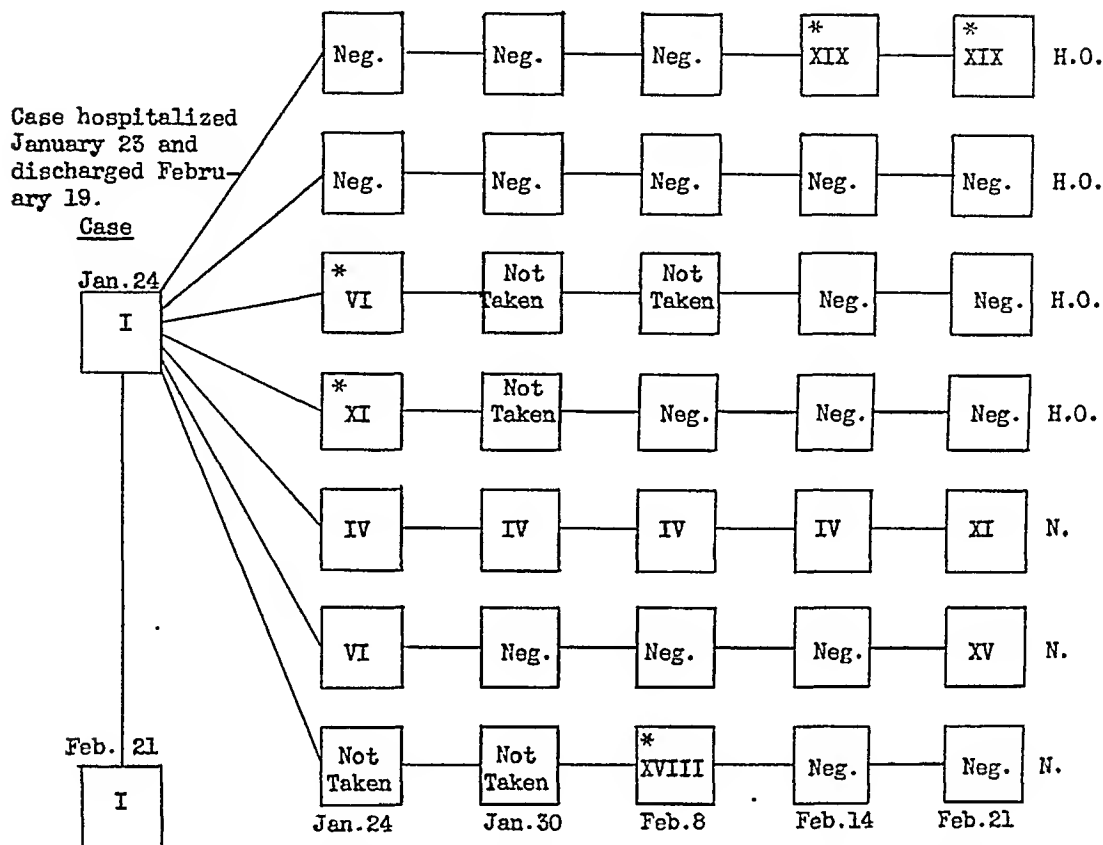
NASOPHARYNGEAL CULTURES ON HOSPITAL PATIENT AND FAMILY CONTACTS OF CASES OF LOBAR PNEUMONIA DUE TO TYPE II PNEUMOCOCCI

	Cases	Contacts	Contact Days	Negative	Positive and not Homologous	Positive and Homologous	Per Cent Positive and Homologous
Hospital Contacts	11	33	281	25	25	1	3.0
Family Contacts	10	37	134	9	22	6	16.2

DIAGRAM 1

PNEUMOCOCCI ISOLATED FROM THE NASOPHARYNGES OF FOUR HOUSE OFFICERS AND THREE NURSES IN CHARGE OF A WARD IN WHICH A CASE OF TYPE I LOBAR PNEUMONIA WAS TREATED

Hospital Staff Contacts



*Indicates the presence of a cold at the time the culture was taken.
H.O. indicates House Officer
N. indicates Nurse.

Family contacts were considered only when they had been in contact with the patient within 7 days; and hospital patients were cultured only if they occupied contiguous beds in a large ward or were in a small 4- or 5-bed ward with the case. Thus, all contacts could be called intimate from the point of view of ease of exchange of nasopharyngeal flora by droplets.

The distribution of cases and contacts was: 61 patient contacts of 20 Type I cases; 62 family contacts of 17 Type I cases; 33 patient contacts of 11 Type II cases; 37 family contacts of 10 Type

II cases; and 71 hospital staff contacts of 5 Type I and 1 Type II cases.

A summary of the results of the study of these 5 groups is shown in Tables I, II, and III. Diagram I illustrates the details of a typical study on hospital staff contacts.

The striking thing about the tables is the high percentage of homologous carriers among the family contacts, as compared to the low percentage among hospital staff or patient contacts. This difference is further emphasized when we compare the number of contact days for family contacts with the number of

TABLE III

NASOPHARYNGEAL CULTURES ON HOSPITAL PATIENTS, HOSPITAL STAFF AND FAMILY CONTACTS OF CASES OF LOBAR PNEUMONIA DUE TO TYPE I OR II PNEUMOCOCCI

	Cases	Contacts	Contact Days	Negative	Positive and not Homologous	Positive and Homologous	Per Cent Positive and Homologous
Hospital Patient Contacts	31	94	707	63	75	2	2.1
Hospital Staff Contacts	6	71	610	42	27	2	2.8
Family Contacts	27	99	287	22	56	21	21.2

contact days for hospital staff and patient contacts. Sixty-two family contacts of 17 Type I cases were exposed for 153 days and yielded 15, or 24.2 per cent, homologous carriers, whereas 61 hospital patient contacts of 20 Type I cases were exposed for 426 days and yielded only 1, or 1.6 per cent, homologous carriers. A similar relationship exists for contacts of Type II cases. Thirty-seven family contacts of 10 Type II cases yielded 6, or 16.2 per cent, homologous carriers for 134 days exposure, whereas 33 hospital patient contacts of 11 Type II cases yielded only 1, or 3.0 per cent, homologous carriers after 281 contact days. Similarly, 71 hospital staff contacts of 5 Type I and 1 Type II cases yielded only 2, or 2.8 per cent, homologous carriers after 610 days of exposure.

Another striking thing in relation to family contacts should be emphasized, namely, that one is just as likely to find homologous carriers among the family contacts of cases of Type I or II lobar pneumonia on the first day of exposure as after a week of exposure. That is, the number of contact days following the onset of the lobar pneumonia does not appear to affect the carrier rate in the home. This, coupled with the low rate of spread in hospitals, suggests that there must be some additional factor which determines whether or

not a Type I or II pneumococcus becomes established in the nasopharynx of persons that are exposed to cases of lobar pneumonia due to these particular strains.

In order to study this phenomenon further, we determined to introduce a known healthy carrier of Type I pneumococcus into a group of normal persons that were free from pneumococci of this particular type, and then to measure the spread of the organism in the new, uninfected environment, incident with the culturing of a group of controls in the Wrentham State School for Mental Defectives, we discovered that an inmate, E. H., age 28, harbored a strain of virulent Type I pneumococcus in her nasopharynx. E. H. gave no history of previous pneumonia, nor of contact with a case. E. H. was in Building F, housing a group of slightly mentally retarded females, averaging about 25 years of age, so that the group was fairly similar to one of normal adults. On the campus was another building—B—with a comparable group of women at a slightly higher age level, averaging about 30 years of age. Each building was a unit, with little contact from building to building, or with the outside.

The plan followed was to culture first the occupants of Building F, in

which E. H. had been a patient for several years. We also cultured the occupants of Building B in order to establish the normal nasopharyngeal flora of the persons in the two buildings. We then transferred E. H. to Building B and cultured, at frequent intervals, her new contacts in this new environment.

Building F contained 116 girls. They were about equally divided between 3 wards in which the beds were arranged as elsewhere in the institution; the head of one touching the foot of the next one, and the rows separated by a narrow aisle just wide enough to allow a person to walk between the rows. The night time contact, therefore, could be considered closer than would be found either in the home or in a gen-

eral hospital. Building B housed 97 girls under exactly the same living conditions, so that the degree of contact in the two buildings was comparable.

The two buildings gave a total of 213 persons. Of these 103 (48.3 per cent) harbored pneumococci of various types, and 110 (51.7 per cent) did not. These percentages are compatible with the figures obtained by other workers for the normal population. Gundel,³ in 1,114 cultures of school children, found 734 strains of pneumococci, and Smillie,¹ in 458 cultures of a cross-section of the normal population, found 212 strains. In our series of cultures from Building B and F, all of the 32 Cooper types except II, XXII, XXIII, XXVI, XXVII, XXIX, XXXI, and XXXII were recovered. Types III,

TABLE IV

TYPES OF PNEUMOCOCCI PRESENT IN THE NASOPHARYNGES OF CONTACTS WITH A TYPE I PNEUMOCOCCUS HEALTHY CARRIER BEFORE AND AFTER THE INTRODUCTION OF THE INFECTED PERSON INTO THE DORMITORY

		<i>Type of Pneumococcus</i>							
		July							
	Case No.	11	17	18	19	21	24	27	28
Type I Carrier	—	—	—	—	*	I	I	I	I
Contacts in contiguous beds and at same dining table	1	—	Neg.	—	*	VI	Neg.	VI	Neg.
	2	—	Neg.	—	*	Neg.	VI	VI	VI
	3	III	—	—	*	III	Neg.	IV	Neg.
	4	—	—	VI	*	VI	XXVI	VI	VI
	5	VIII	—	—	*	VIII	VIII	VIII	VIII
	6	—	—	Neg.	*	III	VI	VI	VI
Contacts at same dining table, but not in contiguous beds	7	Neg.	—	—	*	—	Neg.	—	VII
	8	Neg.	—	—	*	—	II	—	II
	9	VII	—	—	*	—	VIII	VIII	VIII
	10	VII	—	—	*	—	XI, XVI	—	XI, XVI
Contacts in contiguous beds, but not at same dining table	11	—	—	Neg.	*	III	—	Neg.	Neg.

* Type I carrier introduced on this date

VII, X, and XVIII were found most frequently, but no single type predominated. Type I was not found in Building B. In Building F, where the carrier was an inmate, 2 other girls yielded Type I pneumococcus on one occasion. It was impossible to obtain this organism from these 2 inmates on repeat cultures. Only E. H. was continually positive for the virulent Type I pneumococcus.

The culturing of the two buildings was started on June 28, and was completed on July 19, on which date E. H. was transferred from Building F to Building B, and her new contacts were then cultured at intervals. Our procedure by days follows:

- July 21—Contacts in contiguous beds—Building B
- July 21—Previous contacts in contagious beds—Building F
- July 24—Contacts at same dining table—Building B
- July 26—Contacts in same ward, but not in contiguous beds—Building B
- July 26—Contacts in same building, but not in same ward—Building B
- July 26—Previous contacts not in same ward—Building F
- July 27—Contacts in same building, but not in same ward—Building B
- July 27—Contacts in contiguous beds—Building B
- July 28—Contacts at same dining table—Building B
- July 28—Contacts in contiguous beds—Building B

It will be noted that we concentrated our efforts on contacts occupying beds contiguous to E. H. and to contacts eating at the same dining table. Many of the people in the contiguous beds also used the same dining table, so that some had more contact than others. As a check, cultures were also taken from time to time in the other wards in Building B and in Building F from which E. H. had come. None of these control cultures were positive for Type I pneumococcus.

The results of one group of serial

cultures of intimate contacts of E. H. in her new environment are shown in Table IV. It is obvious from this table that E. H. did not infect her new contacts with Type I pneumococcus, though she continued to carry this strain throughout her stay in Building B.

Analysis of all the data, consisting of approximately 125 nasopharyngeal cultures of immediate contacts, reveals that the introduction of an individual harboring Type I pneumococci in the nasopharynx into a group of people having continued close contact with the carrier was without effect. This statement, however, is modified by the length of contact, which was fairly short, July 19–28; and by the time of the year, July—a month during which the incidence of pneumococci in the population is low, and in which little lobar pneumonia occurs. Additional important data would be secured if one repeated the Wrentham experiment during the winter months, or during an outbreak of upper respiratory disease, such as the common cold.

We have some evidence that Type I pneumococci, under certain conditions, may be transmitted through contact in the hospital. In one instance of close contact of a hospital staff member with an infected person, it would appear that a strain of Type I pneumococcus was transmitted from patient to contact and that lobar pneumonia due to Type I pneumococcus had resulted.

On March 9, a girl $2\frac{1}{2}$ years old, suffering from lobar pneumonia, complicated by an empyema, was hospitalized, and Type I pneumococci were isolated from the nasopharynx, and from the pleural fluid. We made serial nasopharyngeal cultures on 7 doctors and 3 nurses who came in contact with this child. On March 20, Dr. A., who was in charge of aspirating pus from the pleural cavity, developed lobar pneumonia due to Type I pneumococcus.

Dr. B. assumed care of the child, and on March 25 a nasopharyngeal culture of his throat revealed Type I pneumococcus, but he did not develop pneumonia. The remaining 5 doctors and 3 nurses were cultured repeatedly until April 11, on which date the case ceased to exhibit Type I organisms. None of them became positive for Type I pneumococcus.

Since this child was the only known source of Type I pneumococcus in the hospital, it would seem reasonable to assume that this patient was responsible for the spread of the infection to the 2 doctors, the spread probably being influenced by the intimate contact as-

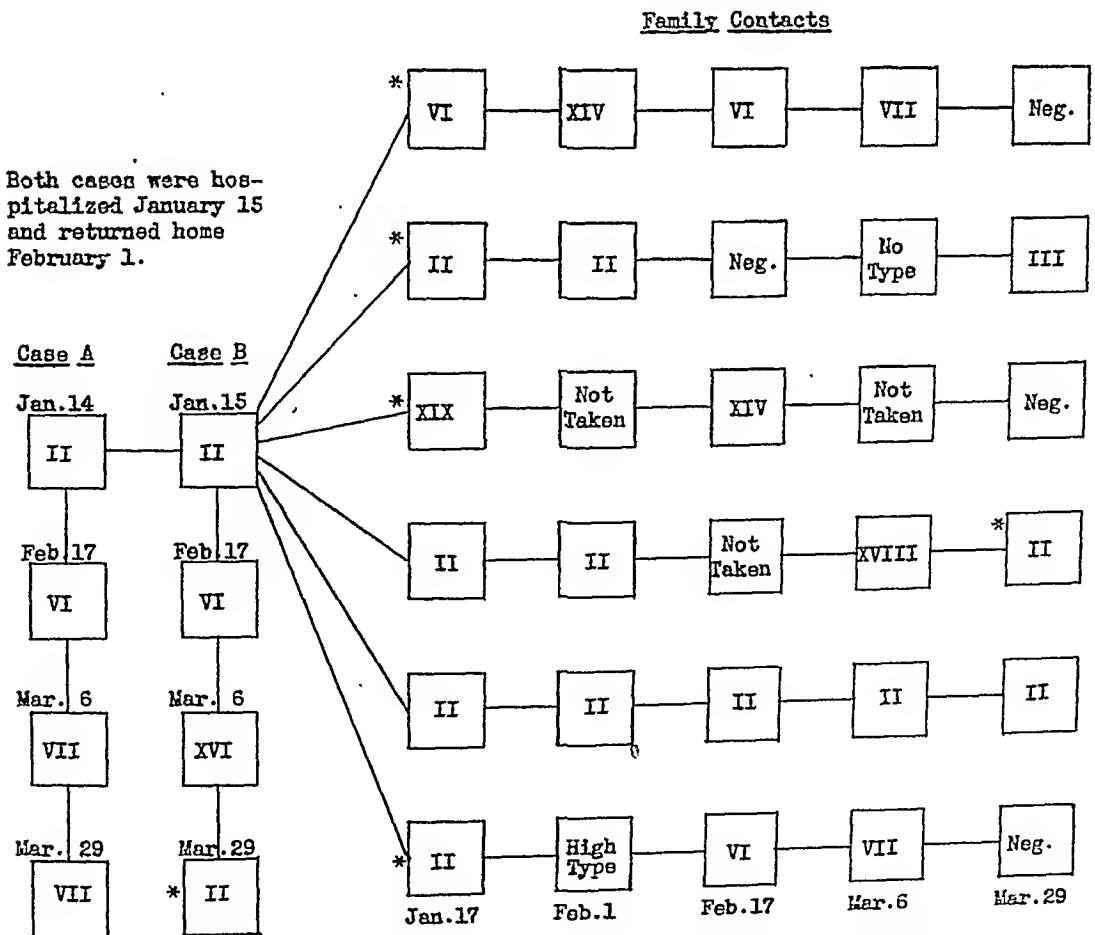
sociated with the aspiration of the pleural cavity of a small child.

Several families in which there occurred a high percentage of contacts that carried Type I or II pneumococci were studied with special care.

Family A—The mother of Family A became ill on January 14 with lobar pneumonia. The infecting organism was Type II pneumococcus. On the following day a small daughter developed lobar pneumonia, also caused by a Type II pneumococcus. Both patients were removed to a local hospital on January 15. On January 17, the 6 remaining members of the family, 1 man, 2 boys, and 3 girls, were cul-

DIAGRAM 2

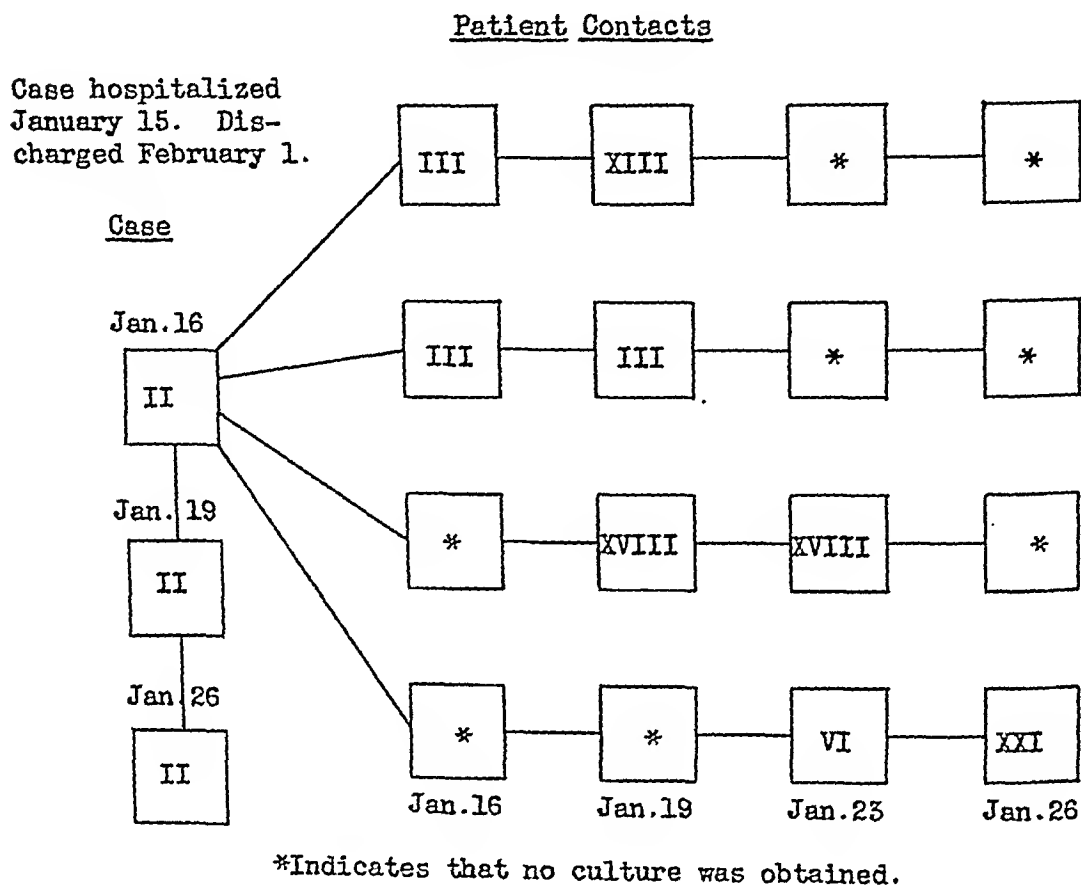
PNEUMOCOCCI ISOLATED FROM THE NASOPHARYNGES OF SIX MEMBERS OF A FAMILY IN WHICH TWO CASES OF TYPE II LOBAR PNEUMONIA OCCURRED



*Indicates the presence of a cold at the time the culture was taken.

DIAGRAM 3

PNEUMOCOCCI ISOLATED FROM THE NASOPHARYNGES OF FOUR PATIENTS OCCUPYING THE SAME FIVE-BED WARD AS A CASE OF TYPE II LOBAR PNEUMONIA



tured. Type II pneumococci were recovered from the nasopharynges of 4 of these contacts. Two that carried Type II pneumococci had had colds at the time the cultures were taken, and 2 had not had bad colds for more than a month.

These 6 contacts were recultured at about 2-week intervals until 5 serial cultures had been obtained (Diagram II). It will be noted from the diagram that 1 continued positive for Type II pneumococcus throughout; 1 yielded Type II pneumococcus only on the first culture; 1 yielded Type II on the second culture, became negative to Type II, and finally exhibited a Type III;

and 1 yielded a Type II on the second and last cultures, having been negative for Type II in the meantime.

The 2 patients who had been in the hospital with pneumonia returned home on February 1, free from Type II pneumococcus. The mother remained consistently negative, but her daughter became positive for Type II pneumococcus again, after being negative for this strain on two previous cultures. It is interesting to note that during the 2½ months that the family was studied it was never free from a source of Type II pneumococcus, and that the 2 persons who became negative to Type II pneumococcus and later positive both

gave a history of an acute cold at the time the Type II pneumococcus was recovered.

The mother of Family A was hospitalized in a 5-bed ward and serial cultures were taken on the 4 patients in her new environment. These having on the average at least 4 days close contact with her, each failed to yield a Type II pneumococcus (Diagram 3).

Family B—On January 23, the mother of Family B developed lobar pneumonia due to Type I pneumococcus. On January 27, 4 days after the patient had been removed to a hospital, nasopharyngeal cultures were taken on 10 home contacts, 6 of whom were found to be carrying Type I pneumococci. In this particular family, 9 of the 10 contacts, which included all 6 of the homologous carriers, had severe colds at the time the cultures were taken (Diagram 4). This family was not followed at short intervals, but

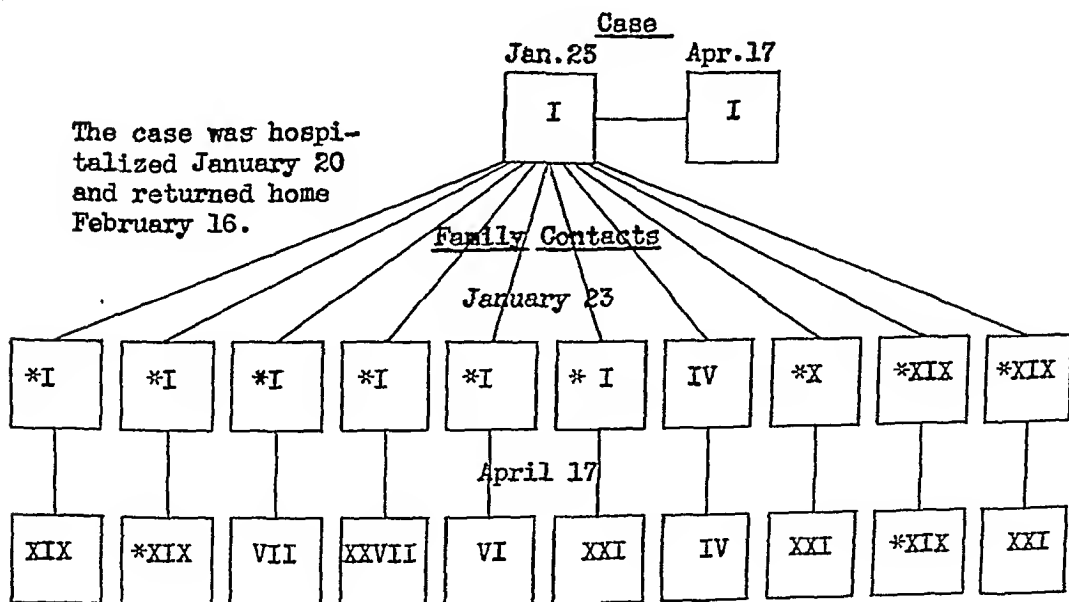
when recultured April 17, nearly 3 months later, none of the contacts yielded Type I pneumococci. The original case, however, who had recovered and returned home February 16, was still positive for Type I pneumococcus on April 17.

The mother of Family B was hospitalized in a 5-bed ward and serial cultures were taken on the 4 patients in her new environment. As with Family A, the 4 patients, having at least 4 days close contact with her, each failed to yield a Type I pneumococcus.

Family C—In April, 1932, a 13 year old boy in Family C developed lobar pneumonia due to Type II pneumococcus. Five family contacts that were cultured at the time yielded 4 type II carriers. This family was not followed at frequent intervals, but the hospital records show that the child developed a chronic empyema, from which Type II pneumococci were recovered, and which

DIAGRAM 4

PNEUMOCOCCI ISOLATED FROM THE NASOPHARYNGES OF TEN MEMBERS OF A FAMILY IN WHICH ONE CASE OF TYPE I LOBAR PNEUMONIA OCCURRED



*Indicates the presence of a cold at the time the culture was taken.

continued to discharge for several months after the child returned home. The family was recultured in April, 1933, nearly a year later, and Type II pneumococci were recovered from the nasopharynges of the original case and 3 of the 4 original carriers.

THE RELATIONSHIP OF ACUTE RESPIRATORY DISEASE IN CONTACTS OF TYPE I OR II LOBAR PNEUMONIA TO PREVALENCE OF PNEUMOCOCCI IN THE NASOPHARYNX

It has been suggested that a person with a cold is more likely to harbor pneumococci than one without a cold. Our data indicate, however, that pneumococci were not significantly more prevalent in contacts suffering from colds than in those free from colds. A different picture was presented when we considered only the group of contacts of Type I or II cases which harbored the homologous organism. Of our group of 25 homologous carriers, 19, or 76 per cent, had colds at the time they were cultured. The numbers are small, but the figures are significant, and suggest further study in this direction.

Our data indicate that overcrowded living conditions in the home, and also low economic status were not factors in the establishment of carriers of Type I and Type II pneumococci.

SUMMARY AND CONCLUSIONS

1. Nasopharyngeal cultures from 264 contacts of 64 cases of lobar pneumonia due to

Type I and Type II pneumococcus have been studied. The results indicate that $20\pm$ per cent of the immediate family contacts of these patients harbored the homologous strain in their nasopharynges. The hospital contacts of the same patients, however, were seldom infected (about 2 per cent). These results suggest that it is quite justifiable to treat cases of lobar pneumonia due to Type I and Type II pneumococci in the open wards of our general hospitals.

2. One experiment indicates that a healthy carrier of Type I pneumococcus does not transmit this organism to immediate contacts, even though the individuals are living under overcrowded conditions.

3. Our evidence suggests that there is some additional factor other than simple contact which determines the transfer of Type I or II pneumococci from a patient with lobar pneumonia to contacts. Nineteen of the 25 family contacts of cases of lobar pneumonia due to Type I or Type II pneumococci that became homologous carriers were suffering from acute colds at the time the cultures were taken. Positive cultures were found as frequently on the first day of exposure as after a week. This evidence suggests that family epidemics of colds may be a factor which determines the transfer and establishment of Type I and Type II pneumococci from the infected to the uninfected.

4. Carriers of Type I and Type II pneumococci, when once established, may continue as carriers of these strains for a considerable period of time without giving rise to lobar pneumonia in the carrier or his contacts and without producing a second group of carriers.

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DR. ROSENAU RECEIVES SEDGWICK MEMORIAL MEDAL

AT the Indianapolis Annual Meeting the Sedgwick Memorial Medal for distinguished service in public health was awarded to Milton J. Rosenau, M.D., of Harvard Medical School.

The presentation speech by Professor E. O. Jordan, Chairman of the Sedgwick Memorial Medal Committee, was as follows:

"It is my privilege, as Chairman of the Committee on the Sedgwick Memorial Medal, to announce the award of this medal for distinguished service in public health to Milton Joseph Rosenau of the Harvard Medical School. The award is made on the basis of Dr. Rosenau's long and fruitful career in the field of public health, for his remarkably successful 10-year administration of the Hygienic Laboratory of the U. S. Public Health Service where he carried out pioneer investigations on anaphylaxis, for his practical work on disinfectants and on the pasteurization of milk, for his numerous original contributions to bacteriology and epi-

demiology, for his wise and inspiring participation in coöperative research upon influenza, pneumonia, and poliomyelitis, and especially for the service he has



Milton J. Rosenau, M.D.

rendered public health workers throughout the world by his classic book, *Preventive Medicine*. This award is peculiarly appropriate since Dr. Rosenau and Professor Sedgwick were intimately associated in the organization and direction of the pioneer Harvard-Technology School of Public Health."

Dr. Rosenau has been a member of the American Public Health Association since 1909, and is a Charter Fellow.

CLEAN FOOD, CLEAN HANDS, CLEAN DISHES

THE recent outbreak of amebic dysentery, which has caused more than 20 deaths, and which has spread to more than 100 communities throughout the country during the past few months, points to a task demanding the serious attention of all health departments: that of eliminating insanitary practices in the dispensing of food and drinks.

Amebic dysentery¹ first broke out in a Chicago hotel, where it was traced to food handlers.² The disease spread rapidly to other food handlers and thence to guests of the hotel, many of whom were visiting the Century of Progress Exposition, and it was carried back to more than a hundred widely scattered communities.

This is one example of what can happen when purveyors of food and drinks are not required to uphold high standards of sanitation, and when there is inadequate medical examination and supervision.

It is well known that in most restaurants, soda fountains and other public eating places, the basic principles of sanitation are not generally observed. No food handler, without first washing his hands thoroughly with soap and water, should serve a customer. How many do it? No dish should be used for serving food or drinks without first being thoroughly cleansed "in a solution of soap or soda or suitable cleaning powder in hot water followed by a thorough rinsing or spraying or immersion in clean boiling water (212° F.) for a period of 1 minute, or in hot water of a temperature of not less than 180° F. at all times when used for purposes of sterilization, for a period of 2 minutes; by sterilization with live steam, or by some other equally effective method approved by the Department of Health."³ What proportion of utensils used in public eating places, especially soda fountains, are washed in this way?

About 92 per cent of all communicable diseases are transmitted through the mouth and nose. Surely there is no better place to break the chain of saliva-borne and food-borne infections than at eating and drinking places. Transmission of disease by food and drink dispensers will end when the public demands that all food and drinks be served by healthy attendants with clean hands, in clean dishes, and health departments take vigorous action to enforce sanitary codes.

Health departments can help more than any other agencies in educating the public to demand that sanitary laws be strictly obeyed. This demand must come from the public. It is because of public apathy that sanitary laws now on the books are not more generally enforced.

Years ago the public accepted the common drinking cup. We believed that unnecessary sickness and death was the result, but the public did not seem to care. The public did not understand; that was the real reason it tolerated this deadly disease carrier. When health departments convinced the public of the awful price of the common drinking cup, action was demanded for its abolishment.

However, the common drinking cup has never really been abolished. We still have it, though not in the same form as before. Now it is in the form of glasses, dishes, and tableware inadequately cleansed between servings. Go to almost any soda fountain, in any city; watch the attendant pluck a glass from the counter, swish it about hastily in a basin of muddy-looking tepid water, rinse it quickly in cold water, then use it to serve another customer.

That glass is worse than the common drinking cup! Its superficial washing has served only to bring it into contact with germs from many other glasses "washed" in the same water.

Influenza, the common cold, tuberculosis, pneumonia, scarlet fever, diphtheria, whooping cough, and Vincent's angina,⁴ are among the principal diseases that can be transmitted by unclean eating utensils. Pathogenic organisms are not removed by common methods of washing. After they are used and hand washed, more than 20 per cent of the organisms remain adhering to eating and drinking utensils.⁵

Clean food, clean hands, clean dishes: These three hold great hope for the control of saliva-borne infections.

To educate the public, to demand sanitary practices in the dispensing of food and drink in restaurants, soda fountains, and other public eating places, there has been organized in New York City The Committee for the Study and Promotion of the Sanitary Dispensing of Food and Drinks.

This committee is urging the public, in its own interest, to follow four courses of action when eating in public:

1. Decline dishes, cups or glasses that are obviously unclean.
2. Quietly protest to the management against all insanitary practices observed.
3. Commend the management of public eating places that uphold high sanitary standards.
4. Report by name and address to the Board of Health, all public eating and drinking places violating high sanitary standards.

Endorsement of the purposes of the committee has already been given by many leaders in civic, industrial and public health fields.

NOTE: Dr. Alec N. Thomson, Secretary of the Public Health Committee of the Medical Society, County of Kings, is chairman of the Committee. Homer N. Calver, former editor of this JOURNAL, is executive officer.

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BOVINE TUBERCULOSIS IN THE BRITISH ISLES

DURING the last few years the inhabitants of the British Isles seem to have become thoroughly aroused over the danger of bovine tuberculosis to human health. Much of this is apparently due to the report of the People's League of Health in 1932, an organization which seems to have been brought into being by Miss Olga Nethersole, who got together a committee of which the leading English journals spoke in the highest terms. Their report was thorough and an eye opener. Since that time the general findings have been endorsed by Sir George Newman and given official sanction. This history is somewhat surprising in view of the fact that the question of bovine tuberculosis and its relation to human health was brought to the fore at the Congress on Tuberculosis held in London in 1901, following which the English Royal Commission on Tuberculosis, which has done such excellent work, was appointed.

The Germans appointed an Imperial Commission, which after struggling vainly to support Koch's contention as to the lack of danger to human health from bovine tuberculosis, finally agreed to pretty nearly everything which we now know to be true. While bacteriologists, doctors and veterinarians in England, the Scandinavian countries, France, and even in Germany, had held that bovine tuberculosis was a menace to human health, we must say emphatically that the first positive proof of this was given from the Laboratory of the State Live Stock Sanitary Board of Pennsylvania early in 1902, though at the London Congress alluded to a paper from the same laboratory was read on the subject and a verbal report given of many cases of human infection from bovine sources, all of which seems to have escaped the notice of the English writers, with one or two exceptions.

The latest exposition of the subject is given by Savage.¹ He reiterates what we have taught in America for many years; namely, that the bovine tubercle bacillus belongs to the same species as other forms of the germ, having acquired its peculiar characteristics, probably by residence in the bodies of cattle. He combats the statement, which is not much heard in America, that the bovine strain is less virulent for man than the human, and says correctly that many cases of generalized tuberculosis are due to the bovine strain.

Most striking are the figures calculated from the tables of the Registrar-General of England, showing that from 1920 to 1931 inclusive, there have been 25,166 human deaths in England due to the bovine tubercle bacillus, not to mention the many thousands of cases of crippling and disablement from the same germ. Another table demonstrates, what has been taught so long in this country, that bovine infection takes place during the milk consuming years—1 to 5. He repeats the statistics given by the People's League of Health, and since, officially, showing that about 40 per cent of the cattle of England and Scotland are reactors to tuberculin and estimates that about $2\frac{1}{2}$ per cent of them are infective. Udder tuberculosis is most dangerous from the human standpoint, though the pulmonary form is most dangerous to other cattle.

We have commented on the Manchester situation in which laws concerning pasteurization failed by a popular vote. In view of the statements that most of the herds of England contain from 40 to 50 per cent of reactors, that the milk is sold without supervision or pasteurization, and that there are no legislative measures which deal with the reduction of bovine tuberculosis, we cannot but stand aghast, though it is not entirely news to us.

Almost coincident with this Mitchell Lecture comes a Memorandum² and a Report³ concerning the situation in Scotland, which is admittedly in a bad case even in England. In Scotland, Glasgow appears to have the worst record of any city. The report points out that the bulking of milk as now carried on increases the danger of infection, over 30 per cent of positive results having been obtained from large bulk supplies, while the lowest incidence of infection is found in the samples obtained from small dairy farms. Savage¹ defends the bulking of milk, arguing that the dilution decreases the number of organisms found in a given sample as compared with the badly infected units which contaminate the bulk milk. It is pointed out in the Memorandum that non-pulmonary tuberculosis is preëminently a disease of childhood, that 70 per cent of the patients become infected under 15 years of age, and that in 90 per cent one or the other of three forms—bone and joint infection, disease of the abdomen, or of the cervical glands—become manifest.

Dr. Blacklock⁴ indicates that approximately 80 per cent of abdominal, 35 per cent of bone and joint, and 64 per cent of cervical gland tuberculosis in Glasgow, where he made his investigations, are of bovine origin. Non-pulmonary tuberculosis still accounts for more than 4,000 cases and 1,000 deaths annually in Scotland, of which 900 cases and 300 deaths occur in the City of Glasgow.

We are glad to note in this report a strong statement concerning pasteurization, holding, what we have demonstrated so clearly in America for a number of years, that it is the greatest single preventive of bovine infection we have, and that there is no impairment of the nutritive qualities of the milk.

In America we are fortunate with respect to control of bovine tuberculosis, largely owing to the activities of our Bureau of Animal Industry. The most recent compilation⁵ gives the death rate from respiratory tuberculosis and other forms from 1900–1932 inclusive, with some figures for 1933. In 1918, intensive testing of cattle began in many of our states, and in some, earlier (Minnesota, 1904, Wisconsin, 1911). The summary for the United States shows that the death rate per 100,000 for tuberculosis had generally decreased from 1900 to 1918, although in some areas there was a slight increase. From 1918 to the present, there has been a marked decrease in the tuberculosis rate, reaching for 1932, 56.6 for respiratory tuberculosis, and 6.4 for other forms; during that time, 115,170,388 cattle were tested and 2,693,570 reactors removed from herds. There have been other factors working, prominent among which is the increased pasteurization of milk, but when all is said and done, the eradication of tuberculosis from herds must be given due credit for the part it has played in the remarkable improvement which has taken place.

We feel a justifiable pride in the record made. We congratulate our Bureau of Animal Industry upon its excellent work, and would be glad to see the National Tuberculosis Association take an active part in this aspect of tuberculosis control.

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LETTER FROM GREAT BRITAIN

APPROPRIATIONS AND ESTIMATES

In conversation with American colleagues, one of the questions most frequently put up to me has reference to the amount of "appropriation" for health purposes. Always I try very hard to avoid having this question asked, and always, although I rarely succeed, I try to avoid answering it. The reason for these evasions is that the method of appropriation, as it is understood in the United States, is not followed here, and it is so very difficult to explain just what the process is. Moreover, it is practically impossible to name a figure that would actually represent the amount expended on health works, for the reason that the group of activities coming within the purview of the health officer in Britain is not quite comparable with those under the charge of his colleague in the United States.

Further, between districts of various classes in this country there are differences, and the expenditure in one area may appear less than in another, merely because some particular type of work that is dealt with in the health department in one is the responsibility of the officer of another department in the other.

Probably nowhere are differences so marked as in the metropolis, and nowhere is the difficulty greater of giving an indication of the amount devoted to health work throughout the county as a whole, or in various of the 28 boroughs or cities into which the metropolis is divided for local government purposes. For the assistance of those concerned to discover expenditures and to make comparisons, the London County Council issues annually, by way of appendix to their annual report, a collection of

tables particularizing a number of matters. From the point of view of the health worker the most interesting of these is that headed "Expenditure of metropolitan borough councils falling on the rates" in the particular year. In this the equivalent rates in the £ are shown in regard to each borough, and in respect of a number of matters.

LONDON HEALTH FINANCE

The variations to be noted in every single branch are astonishing, and without explanation or knowledge of circumstances and conditions in the various areas, conclusions entirely erroneous would be formed. Take the treatment of tuberculosis for example. Here the expenditure practically everywhere is trivial, amounting only in three boroughs to a rate of over one penny in the £.

To account for the variations there are a number of explanations: the size of the borough and its population; the circumstances and condition of the inhabitants; the trades carried on; the amount of work done by voluntary bodies; and so forth. In connection with the lowness of the figure—the smallness of the appropriation if you like—in all cases the point to be borne in mind is that sanatorium provision and treatment are not included, this being the business of the London County Council. The position in regard to maternity and child welfare is interesting also, the amount expended in terms of rates in the £ varying from 0.2 penny to 7.7 pence. The higher expenditure, as might be expected, is incurred in the poorer areas; the lower in those of a higher class, the City of Westminster (0.2 penny), St. Marylebone (0.6), for instance.

Curiously enough also in the matter of this work, all the advantages are on the side of the high-class boroughs, since whereas in them voluntary organizations are active in assisting the municipality and in this way reducing the burden on the rates, in the poorer areas voluntary workers are few and far between, and the scheme is entirely an official one paid for out of the rates. Further, it must be remembered that in no case is the amount spent on health work for the benefit of school children included. This is an activity exclusively in the hands of the London County Council as education authority, and information as to the amount expended upon it must be sought for in the accounts of that body. All of which does not make it any easier to understand or to explain the situation in regard to health appropriations.

A CENTURY OF FACTORY HYGIENE

Though it is some months since it appeared, I find I have not yet referred to the report of the Chief Inspector of Factories and Workshops for last year. This is all the more regrettable as the year 1932 marks the hundredth anniversary of the appointment of the first government inspector of factories. It was after the passing of the Factory Act of 1833 (entitled "An act to regulate the labour of children and young persons in the mills and factories of the United Kingdom") that the inspectors, four in number, were appointed. Each inspector had power to appoint "superintendents" or "sub-inspectors." In addition to, himself, writing a most fascinating historical note by way of introduction, Mr. D. R. Wilson, the chief inspector—whose first annual report it is, by the way, since taking up the post in succession to Sir Gerald Bellhouse—includes reviews on various aspects of the work by Miss Taylor, Mr. Lauder, Dr. Bridge, and other members of the inspectorate.

In no branch of the work has the progress made during the century been greater than in health. Writing with regard to it, Dr. Bridge provides a note of extreme interest, showing the advances made in each of the main periods in which certain particular acts were operated or events, like the War, enacted. Naturally, of course, he finds it quite easy to show that very much of what has happened was anticipated at the very beginning of the era. The individual to whom credit is given for having foreseen the trend of events was a Dr. Thackrah of Leeds, who, in 1831 published a small book on the effects of the principal arts, trades and professions.

In the first period, which extended from 1833 to 1878, in which latter year new legislation came into operation, Sir John Simon, to whom preventive medicine the world over owes so much, was medical officer of the privy council, and very much to the fore. In a special report in which he appeals for improved conditions in factories, more particularly in regard to ventilation, he employs a phrase, which must have been used very frequently in the years that followed, to the effect that "the canker of industrial diseases gnaws at the very root of our national strength." Following this report, provision was made, among other matters, for modifying the hours and meal-times of children and young persons.

DICKENS AND THE LEAD WORKER

In the period of 1879–1894, the benefits of legislation giving power to require exhaust ventilation, by means of a fan, for the removal of dust likely to be injurious to health, and to obtain better sanitary conditions, were enjoyed. The employment of children in certain occupations and trade processes was forbidden, and in 1891 appeared an act in which specific attention was given to compel the introduction of methods

designed to prevent industrial diseases.

Curiously it was not till 1879 that there was reference to lead poisoning, and on this, naturally, Charles Dickens had something to say, particularly in regard to cases in which women were allowed to work in white lead factories with "naked feet" and without respirators. Dickens apparently, at the time, had a feeling that if safety for women lead workers was to be found, it was on the American side of the Atlantic it must be sought, for, says he, "American inventiveness would seem to indicate that before long white lead may be made entirely by machine; the sooner the better." The practicability of making white lead by machinery is not yet, of course, completely established; nevertheless, as Dr. Bridge shows, direct pulping of white lead in oil, eliminating the drying and grinding processes, has been in the last decade the prime factor in the reduction of lead poisoning.

In regard to lead, among other matters, Dr. Bridge pays tribute to the work and memory of Sir Arthur Whitelegge, whose appointment as chief inspector in 1896 "marks a definite stage in the development of the medical work of the department," and of Sir Thomas Legge, who was appointed first medical inspector in 1898. Medically big developments followed the appointment of these two men, many industrial diseases and conditions in industry calling for attention being noted by them and brought under control.

The period 1901-1913 was a busy one from the medical point of view, closer attention being given to lead poisoning and steps taken for dealing with anthrax. In the war period, 1914-1918, Dr. Bridge believes came realization for the first time that "conditions special to the occupation were not the only cause of industrial disease, but that other factors—fatigue, undernourishment, and other conditions met with both inside and outside the time of

employment—were as important in the production of illness as those produced by the materials handled."

FACTORY HYGIENE IN THE FUTURE

Extraordinary strides were made in relation to welfare work, and both during and immediately after the War, the practice of appointing whole- or part-time works doctors spread very rapidly. The medical staff of the department was also enlarged, and this process of enlargement was carried over into the period 1919-1931. Discussing progress and operations in these years, Dr. Bridge notes especially works done in relation to fibrosis of the lung and cancer. In regard to the latter, he mentions the discovery of the high incidence of scrotal epithelioma among cotton mule spinners, and the demonstration by Dr. Henry of the department that the introduction of mineral oil into the lubricant for self-acting mules coincided with the increased incidence. The further discovery was made that sufficient exposure to pitch, tar, mineral oil and compounds, products or residues of these, will, in a certain percentage of persons, produce skin cancer.

That the post-war period has had anxieties apart from these two conditions the review of Dr. Bridge shows. This is particularly the result of the introduction for use in industry of chemicals of a complex nature, used as solvents of cellulose and in the manufacture of synthetic compounds, for example. New industries have brought new problems, while many of the old ones still remain unsolved or in need of close observation. It is inevitable in an age of rapid progress with modern methods replacing older ones, and completely new trades and processes springing up, that this should be so, and no doubt Dr. Bridge and those with him, and those who come after, will be no less alive to the need for watchfulness, and no less capable of recognizing risks

and devising methods of coping with them than those who went before.

The annual reports of the Chief Inspector of Factories for Great Britain is a publication always of interest to workers in the field of preventive medicine; that for 1932, because it relates

to a period so extended and treats of matters so very numerous and important, is likely to provide an interest much more abiding than others of its predecessors.

CHARLES PORTER, M.D.

London

PRESIDENTIAL CORRESPONDENCE

November 23, 1933.

The Honorable
The Secretary of Agriculture
Washington, D. C.

My dear Mr. Secretary:

Members of the American Public Health Association are actively interested in the efforts of the Agricultural Adjustment Administration to improve the economic status of dairy farmers in this country through milk marketing agreements. We recognize that desirable standards of cleanliness and safety of this most important food can not be maintained where farmers continue to receive for their product less than the cost of production.

I wish, therefore, on behalf of the public health authorities in this country, to commend your efforts to place dairying upon a sounder economic basis. We have noted with interest also the provisions of Federal milk marketing agreements that milk dealers agree to all public health and sanitary requirements for their product. While the marketing agreements are designed primarily to meet an emergency situation in the economic aspects of this problem, we feel they will fall far short of their potential good to the public unless they are used also aggressively to promote the sanitary quality of milk. As you know, there are still many tuberculous cows in dairy herds. Contagious abortion assumes increasing importance from year to year as a public health menace. Milk supplies for many areas

still fall short of desirable sanitary standards.

The Federal marketing agreements provide for restriction in the production of milk. I feel it my duty to urge upon you that you consider the desirability, in any plan of production control, of eliminating milk from diseased cows and milk of low sanitary quality. In other words, with an excess of milk available it seems sound, from the economic as well as the health standpoint, to keep off the market all milk from diseased cows and milk produced under insanitary conditions.

The health authorities of this country believe that there would be no real surplus of milk if all persons availed themselves of the amount necessary to promote the optimum growth and nutrition, not only of children but of adults. We are glad, therefore, to join with you in any steps to promote the amount of milk consumption. At present the people of the United States are consuming daily less than half the amount of milk which our present knowledge convinces us should be used in the interest of health and with due regard to economy in the family diet.

If the American Public Health Association can be helpful to you in furthering the purposes which I have outlined please indicate to me how this can be done.

Yours respectfully,

HAVEN EMERSON, M.D., *President*
American Public Health Association

UNITED STATES DEPARTMENT OF
AGRICULTURE
Agricultural Adjustment Administration
Washington, D. C.

December 13, 1933.

Haven Emerson, M.D., President,
American Public Health Association,
450 Seventh Avenue,
New York City, N. Y.

Dear Dr. Emerson:

This acknowledges receipt of your letter of November 23, addressed to Secretary Wallace, and discussing the efforts of the Agricultural Adjustment Administration to improve the economic status of dairy farmers.

You refer to the fact that milk supplies for some cities will fall short of the desirable sanitary standards, and urge the elimination of milk from diseased cows and milk of low quality from dairy markets. In this connection, it will be of interest to you to

know that a committee representing the Department of Agriculture now has under consideration a plan of production control. It has as yet not been definitely decided what the final steps in this plan will be, but it is believed that the eradication of tubercular cattle, and, possibly, the elimination of cows otherwise diseased will be a part of the program.

In the several Marketing Agreements provision is also made for the consumption promotional program, and existing Agreements have been modified and new Agreements are so written that it will be possible for recognized charitable institutions to obtain milk at a low price figure.

Your offer of assistance is greatly appreciated.

Very truly yours,

E. W. GAUMNITZ,
Principal Agricultural Economist,
Dairy Section.

STANDARD METHODS OF MILK ANALYSIS, 6TH EDITION

THE changes and additions in the new edition of Standard Methods were summarized in the April, 1933, issue of the American Journal of Public Health. The new edition is in press and will be available after March 1. It will contain 88 pages, bound in hard covers with waterproof cloth. The price is \$1.00.

ASSOCIATION NEWS

63RD ANNUAL MEETING A.P.H.A.

5TH ANNUAL MEETING WESTERN BRANCH

THE American Public Health Association announces that its Sixty-third Annual Meeting will be held in Pasadena, California, September 3-6, 1934.

The Western Branch of the American Public Health Association, with a membership of more than 1,200 from eleven western states, will hold its

Fifth Annual Meeting at the same time.

Dr. J. D. Dunshee, Health Officer of Pasadena, has been appointed Chairman of the Local Committee on Arrangements. He will be assisted by Dr. John L. Pomeroy, President, and Dr. W. P. Shepard, Secretary of the Western Branch, and other prominent public health authorities on the west coast.

ROYAL SANITARY INSTITUTE MEETING AND HEALTH CONGRESS

THE Executive Board wishes to call attention to the meeting of The Royal Sanitary Institute which is to be held in Norwich, England, from May 15 to May 20, 1934, and to the Health Congress to be held under the auspices of the Royal Sanitary Institute at

Bristol, England, July 9-14, 1934; and asks that any members who plan to attend, or who may be in England at that time and can attend, will notify the Executive Office so that they may be appointed official representatives of the Association.

NEW MEMBERS

The following list includes applicants who have been approved for membership in the A.P.H.A. by the Sub-Committee on Eligibility. These new members have requested affiliation with the sections indicated, and action by the Section Councils will follow.

Health Officers Section

Norman C. Bullock, M.D., City Hall, Rockford, Ill., Commissioner of Health
Bertrand F. Drake, M.D., 425 Beechmont Drive, New Rochelle, N. Y., City Health Officer
George B. Edwards, M.D., Darlington, S. C., County Health Officer
Dr. Thomas J. McCamant, 209 S. Campbell, El Paso, Tex., Director, City-County Health Unit
Howard Morrow, M.D., 384 Post St., San Francisco, Calif., President, Calif. State Board of Health
Samuel B. Ross, M.D., Hotel Roosevelt, New York, N. Y., Medical Inspector, City Dept. of Health

Lee A. Stone, M.D., Box 56, Madera, Calif., County Health Officer
W. Bradford Walker, M.D., Cornwall, Conn., Health Officer

Laboratory Section

Earle K. Borman, M.S., State Dept. of Health, Hartford, Conn., Assistant Director of Laboratories
Frederick D. Carr, 73 Main St., Batavia, N. Y., Director, Genesee County Laboratory
Caryl C. Carson, M.S., 166 Freeman St., Hartford, Conn., Chief Chemist, Bureau of Laboratories, State Dept. of Health
Stephen H. Curtis, M.D., 80 First St., Troy, N. Y., Director, Leonard Hospital Laboratory

Robert B. Dienst, Ph.D., 5649 Woodlawn Ave., Chicago, Ill., engaged in Amebic Dysentery Survey, Chicago Board of Health

Michael Grimes, Ph.D., M.S., Dept. of Dairy Bacteriology, University College, Cork, Irish Free State, Dairy Bacteriologist (Associate)

Ernest B. Hanan, M.D., A.B., 462 Grider St., Buffalo, N. Y., Director of Laboratories, Buffalo City Hospital

Cyril K. Johns, M.Sc., Central Experimental Farm, Ottawa, Ont., Canada, Dairy Bacteriologist, Dominion Dept. of Agriculture

John E. Kieffer, 206 Huntington Ave., Buffalo, N. Y., Graduate Student (Associate)

I. A. Merchant, Ph.D., D.V.M., Yale School of Medicine, New Haven, Conn. (Temporarily on leave), Professor of Veterinary Hygiene, Iowa State College, Ames, Ia.

Julius Pincus, M.D., 250 W. 75 St., New York, N. Y., Director of Clinical Pathological Laboratory

Celia Rubin, 62 W. 91 St., New York, N. Y., Student (Associate)

Joseph R. Sanborn, Ph.D., 133 Ridge St., Glens Falls, N. Y., Bacteriologist, Research Division, International Paper Company

Anna M. Stuart, M.D., 656 Park Place, Elmira, N. Y., City and Chemung County Laboratory Worker

Public Health Engineering Section

William McL. Bingley, B.E., 3623 Spalding Ave., Baltimore, Md., Assistant Sanitary Engineer, Chlorine Institute

Robert W. Kehr, C.E., U. S. Public Health Service, Cincinnati, O., Assistant Sanitary Engineer

C. H. Young, S.E., Trust Bldg., Meadville, Pa., District Engineer, State Dept. of Health

Food and Nutrition Section

Joy C. Wickham, V.S., 1905 Cypress St., Cleveland, O., Milk Inspector

Child Hygiene Section

William J. Ryan, M.D., Pomona, N. Y., Superintendent and Medical Director, Rockland County Tuberculosis Sanatorium.

Public Health Education Section

Adelheid Arfsten, A.B., 600 Stockton St., San Francisco, Calif., Pacific Coast Welfare Supervisor, Metropolitan Life Ins. Co.

Muriel F. Bliss, C.P.H., 697 Park St., Attleboro, Mass., Health Education Research Worker, Mass. Inst. of Tech.

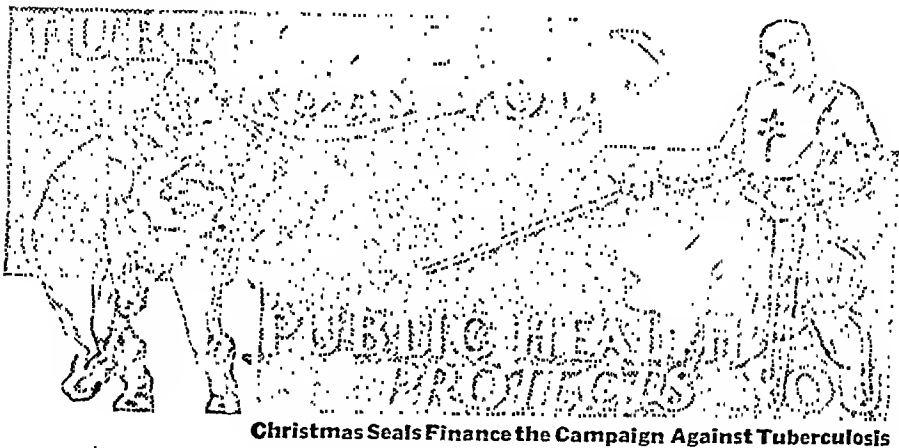
Lily A. Craighan, R.N., P.H.N., Dept. of Public Health, San Francisco, Calif., Supervisor of Health Education

Public Health Nursing Section

Theresa M. Gartner, R.N., Box 252, Tucumcari, N. Mex., School Nurse

Mattie M. Washburn, 325 State St., Albany, N. Y., Assistant Director, Div. of Public Health Nursing, State Dept. of Health

PUBLIC HEALTH ADMINISTRATION



HEALTH RECOVERY CAMPAIGN

EVERY health officer should participate during 1934 in what has come to be known as the Early Diagnosis Campaign, sponsored by tuberculosis associations. The slogan selected, the art design, the printed matter, and newspaper cartoons are all designed to create popular understanding and support of public health activities. Tuberculosis workers are being urged by their leaders to broaden the scope of their health education efforts and to invite all health workers, official and nonofficial, to join with them for the sole purpose of promoting public health.

The slogan: "Tuberculosis Robs You—Public Health Protects You" has been selected for general use by tuberculosis associations throughout the country, but it is not essential that this slogan be used exclusively—it may be adapted to express the immediate health problem. A manual of suggestions has

been prepared for the use of organizers of committees, which emphasizes the importance of making the movement one of the public health group as a whole, subordinating tuberculosis control to whatever relative place in the program it may take by common consent of the members of the committee.

The objects of the campaign have been thus set forth in the preliminary material placed at the disposal of local tuberculosis associations and committees, which is also available through them to other organizations:

1. To increase the general public's appreciation of the benefits it derives from good public health services, with emphasis on the official health department's work, and its needs.

2. To cause the public to demand adequate public health service.

3. To coördinate with the health department the efforts of all voluntary health agencies, as well as civic organi-

zations, clubs, and outstanding individuals to the above ends.

There are to be two posters, one 24-sheet, and the other car card size, the latter supplied printed on cardboard and on paper. The design shows a robber about to escape with his spoils when he is interrupted by a heroic figure with a flaming sword. The caption is "Tuberculosis *Robs* You—Public Health *Protects* You."

Three pieces of printed matter will be provided for use in the campaign.

"Tuberculosis *Robs* You—Public Health *Protects* You," a 4-page circular for wide distribution among the public as a whole at meetings, through interested groups, as enclosures in letters. It tells, briefly, the need for adequate public health protection in terms of what this means to the individual, especially with relation to tuberculosis.

"Mr. Taxpayer Goes Shopping" is intended to help obtain the cooperation of organizations, and should be used with persons in a position to influence

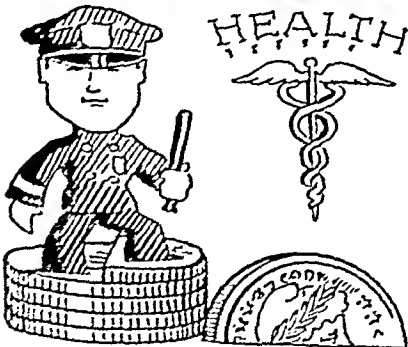
the action of groups to participate in the campaign; leaders in community and civic life. It dramatizes the idea of the average man shopping for his government activities; almost forgetting public health, until he is shown how little it costs in comparison with how much it does for him. The reader is invited, at the end of the leaflet, to join the campaign.

"You Don't Say!" A series of statistical statements supporting the slogan of the campaign, for the information of community leaders, office holders, educators.

A set of 14 cartoons, a single column in width, has been prepared for use in newspapers, and other periodicals, 4 of which are shown in this article. They illustrate such statements as the following, which appear as part of the cuts which will be supplied ready-to-print:

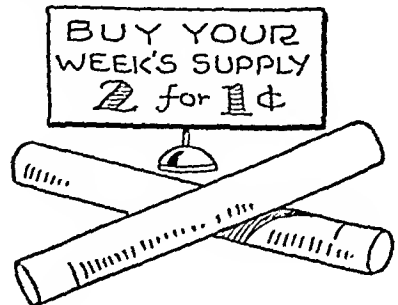
We spend thru taxes about 1 cent per week for health protection (the cost of only 2 cigarettes)

Public Health FACTS



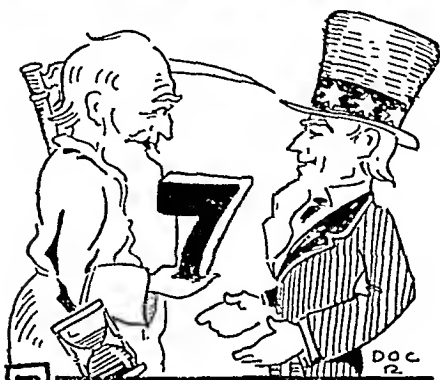
Police protection taxes each person about \$4.52 per year
Health protection about 50¢

Public Health FACTS



We spend thru taxes about 1 cent per week for health protection (the cost of only 2 cigarettes)

Public Health FACTS

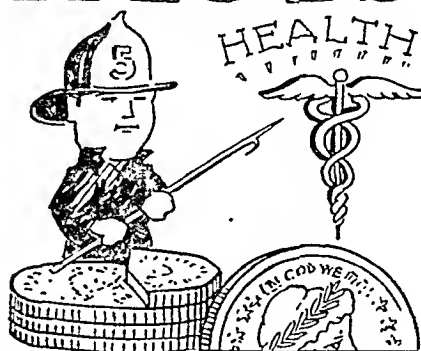


From 1911 to 1931
average length of
life was increased
7 years (U.S.A.)

\$2 per person a year will operate
a fully efficient health department.
Our cities now spend only 75¢ per
person

Public Schools are a bargain at \$16.17
per person
Public Health struggles along on 50¢
per capita

Public Health FACTS



Fire protection
taxes each person
about \$3.32 per year
Health protection
about 50¢

Fire protection taxes each
person about \$3.32 per year
Health protection about 50¢

For further information, consult state
or local tuberculosis associations, or the
National Tuberculosis Association, 450
Seventh Avenue, New York, N. Y.



Decoration for leaflet "Mr. Taxpayer Goes Shopping"

VITAL STATISTICS

Negroes Hard Hit by Tuberculosis—Nearly one-fourth of all deaths from tuberculosis in Illinois are among negroes and other colored races, although they make up less than one-twentieth of the population. Mortality from tuberculosis among negroes in Illinois is 6 times greater than among whites. The death rate from this disease among Illinois negroes is more than twice the death rate from tuberculosis among negroes in Arkansas, Florida, Georgia, Louisiana, Mississippi, or South Carolina, and much greater than in any of the other southern states. About 1 in each 6 deaths from all causes among Illinois negroes results from tuberculosis, whereas among white in this state that disease accounts for only 1 in each 25 deaths.

Furthermore, the progress toward eradicating tuberculosis in Illinois has been much less among negroes than among whites. During the last decade the death rate from tuberculosis among negroes in Illinois has declined only 19 per cent while that among whites has been reduced 45 per cent. Expressed in another way, the rate of decline has been more than twice as great among whites as among negroes in this state.

Only heart impairment causes more deaths than tuberculosis among negroes. Among whites, on the other hand, heart disease, cancer, nephritis, apoplexy, and pneumonia are all much more frequent causes of death than is tuberculosis. Whereas tuberculosis caused only 45 deaths per 100,000 population among whites in Illinois last year, it was responsible for no less than 260 per 100,000 among negroes.

These are facts that cannot be overlooked in the future program against tuberculosis. The more rigorous climate

is perhaps a factor in causing a higher rate from tuberculosis among negroes in Illinois than in the South. Congestion of the negro population (about 240,000) in Chicago is probably another important factor.—*Illinois Health Messenger*, 5:94-95 (Dec. 15), 1933.

Mortality Data for Hong Kong in 1932—The Medical and Sanitary Report of Hong Kong for 1932 contains some interesting data concerning the mortality statistics of the Colony.

In 1932, the civilian population of the Colony had a crude death rate of 24.74 (per 1,000 population) from all causes—a slight increase over the corresponding rate (24.08) for the previous year. The Chinese population alone, which includes 98 per cent of the total population, had a general death rate of 25.02 in 1932 and one of 24.39 in 1931; the non-Chinese experienced a 1932 mortality of 14.16 (per 1,000 population)—a substantial increase over the rate of 11.83 for the previous year. Examination of the infant mortality data shows that the non-Chinese population lost 97.93 infants per 1,000 registered births in 1932, a rate 58 per cent higher than that (61.85) in 1931. It is difficult to calculate an infant death rate among the Chinese population since only a part of the births are reported—yet it is generally admitted to be abnormally high.

Analysis of the mortality by causes of death among the civilian population reveals broncho-pneumonia at the head of the list, rates of 323 and 361 (per 100,000 population) having been recorded for that disease in 1932 and 1931 respectively. Pulmonary tuberculosis was second with death rates of 252 and 260 in the same 2 years. Other leading

causes of death in 1932 were bronchitis with 112 deaths per 100,000 population; diarrhea (infantile)—160; diarrhea (over 1 year)—140; nephritis—89; and heart disease—66.—Tables from *Hong Kong Medical and Sanitary Report*, p. 26–30, 1932.

The Threat of Violent Death to the Male—Why is the mortality of males nearly everywhere higher than that of females? In the early months of life, when the relation of the infant to the external world is essentially the same for both sexes, the higher mortality of the male child can be due only to constitutional causes. That the male child is indeed somewhat more delicate than the female is indicated, among other things, by the fact that among stillbirths males exceed females by over 30 per cent. And even the principal communicable diseases of childhood, namely, measles, scarlet fever, and diphtheria, show a higher death rate among boys than among girls. But when childhood years are past, indications are that constitutional factors play a subordinate part in determining the excess mortality of the male over that of the female. Analysis of the various causes of death, as they affect the two sexes respectively, bears out this view. It is to the external factors that one must look for an explanation. Even in the very earliest years the boy is more venturesome than the girl, and throughout later boyhood, adolescence and his entire adult life, the male is subjected to external dangers not encountered in anything like the same degree by the female.

Analysis of the mortality statistics for the years 1929–1931 among white persons in the U. S. Registration States, as of 1920, clearly reveals this handicap of the male. During the preschool period, or, to be more exact, among children of ages 1 to 4, the death rate from accidents was 70.0 per 100,000 among

boys, as against only 54.3 among girls. At these ages, however, deaths from violent causes form a large part of the total for either sex, taking almost as heavy a toll as measles, scarlet fever, and diphtheria combined, both among boys and among girls.

During the next 10 years of childhood, accidents and other forms of external violence produce a far greater number of deaths among boys than any other single cause. Over one-quarter of the deaths of boys at this age were due to accidents alone. In fact, more schoolboys die as a result of accidents than from all of the usual communicable diseases combined, including influenza-pneumonia and tuberculosis. The accident death rate of boys of this age is almost $2\frac{1}{2}$ times that of girls, 52.7 per 100,000 as against 21.8.

The main working period of life, ranging from 15 to 49 years of age, represents the term of man's greatest exposure to the hazards of industry and of civil life. It is, therefore, not surprising to find that there are more deaths due to external violence among men than from any other cause; practically twice as many male deaths result from violence during these years as are caused by tuberculosis (all forms). The male death rate from violence at ages 15 to 49 exceeds that of females by more than 4 to 1 (142.1 against 33.2). This age period comprises the most productive years of a man's existence; the years during which his value to society is greatest. It is precisely at this time of life that the sudden loss of the head of the family is most disastrous. Great stress has been laid on the needlessly high maternal mortality rates in our country; but the question may well be raised whether the regrettably high maternal death rate is not far exceeded in serious consequences for society and the family by the high and largely avoidable death rate from violence of various sorts among male wage earners.

The combined mortality rate of men from accidents, homicides and suicides during this age period is just $3\frac{1}{2}$ times that of women from causes related to pregnancy and childbirth. If the deaths both from violent causes and also from puerperal causes could be entirely eliminated during this period of life, the mortality of both sexes would not be far different, namely, 376.1 per 100,000 for men as compared with 342.0 for women.

After age 50, the rising tide of deaths from the chronic or degenerative diseases tends to obscure the importance of the violent causes. Nevertheless, the latter remain among the chief causes of mortality among men to the very end of the life span. In the 5-year age period 50-54, the male death rate from external violence is exceeded only by that from organic heart disease. Violence, at this age, is responsible for more than 4 times as many deaths among men as among women (220.6 per 100,000 as against 54.2).

During the next 10 years of life, 55-64, violent deaths among men are outnumbered only by those ascribed to heart disease and cancer. After 65, however, violence as a cause of death is outranked by several diseases, notably heart disease, cancer, cerebral hemorrhage, nephritis and pneumonia.

Although external violence ceases to be the chief cause of death among men after age 50, it nevertheless continues to exact an increasing toll of deaths as old age approaches. Mortality rates from violence in the years 1929 to 1931 combined, among white persons, at the successive age periods were approximately as follows:

RATES PER 100,000

Age Period	Males	Females
45-49	198	44
50-54	221	54
55-64	262	78
65-74	335	167
75 and over	615	692

It is interesting to observe that, as old age advances and the greater activity of the male gradually diminishes to the level of that of the female, the accident death rates for the two sexes more closely approach each other. In fact, it is observed that in extreme old age, accidents were even more frequently the cause of death among women than among men. At this stage of life, vigor ceases to be a factor in violent deaths; instead, the underlying causes are those associated with senescence.

The facts thus brought out by a study of the deaths from violent causes among males and females by individual age groups are also reflected in the average death rates for all ages, as follows:

During the 3-year period, 1929 to 1931, the average death rate from all causes among white males in the Death Registration States of 1920 was 1,094.1 per 100,000, as against 933.7 among white females. In other words, among every 100,000 white males there were 160 more deaths than occurred among an equal number of white females. At the same time the death rate per 100,000 from external causes among males was 148.6, while that of females was only 54.6. Thus, of the 160 extra deaths from all causes among white males, 94 or 59 per cent were attributable to external violence. The deaths from these causes were almost 3 times as many among men as among women.

Fortunately, this excess is capable of reduction by means actually within reach. The various factors in industry, in sport, and in personal habits, which create the special risk for the male, are subject to modification, if sufficient attention is drawn to them. Much has already been done in this direction by such organized efforts as the Safety First movement; but much more still remains to be done. When the full effect of such measures is rendered available, much wastage of human wealth will be prevented, and great gains will be

secured for the individual, for the family, and for the nation.—*Stat. Bull., Met. Life Ins. Co.* 14:3–5 (Nov.), 1933.

Maternal and Infant Care in North Carolina—Since great stress has been laid on the subject in recent months, every reading citizen of the State of North Carolina should have become cognizant of the fact that both the maternal and infant mortality in the state are higher than the national average. The problems of maternal and infant mortality are so closely inter-related that one cannot be discussed without study of the other.

In North Carolina, puerperal causes accounted for 555 deaths and a death rate of 7.2 (per 1,000 live births) among mothers in 1932. In the same period, 5,459 babies died before the end of their first year of life—equal to an infant mortality of 70 (per 1,000 live births). Further analysis shows that 2,424 of the infants died before they were 13 days old; even more deplorable was the fact that 1,209 or more than 1 out of 5 died before they were 1 day old.

Opinions may differ, but all thinking citizens realize that the question is a rather involved one and that the blame cannot be placed on any one doorstep. A number of causes contribute to the high infant and maternal mortality. It is natural to assume that the first place for an investigation is the attendance and care which each expectant mother has received from the inception of her pregnancy to and including the safe delivery of a normal baby.

An examination of the statistics in North Carolina in 1932 shows that midwives delivered about 34 per cent of the women in childbirth for that year. It will be noted that 8,121 white women

were attended exclusively by midwives. Of the 34 per cent attended by midwives, none had the benefit of any form of medical prenatal service except in the instances where upon the direct request of the midwives literature was supplied to them by the State Board of Health. No exact figures are available to prove that, of the remaining 66 per cent attended by physicians, about one-half had the services of the physicians only from the onset of labor; yet it is a safe estimate. This means that about two-thirds of the women in North Carolina go through their pregnancies without any form of direct personal medical prenatal service whatever. For several years, the State Board of Health has been doing its utmost to improve the services of midwives. Toward this end, 6 competent nurses were sent into 56 counties of the state in an effort to impart some instruction to each midwife carrying on her vocation. These nurses examined 1,108 midwives. The nurses found that following their summer's instruction, 224 had the fully equipped bag which the department recommends for midwives to carry; 403 had partially equipped bags; and 454 had no equipment whatever—not even a bar of soap or a pair of scissors.

In almost every one of the aforementioned counties, the county board of health readily agreed to adopt resolutions conferring authority on the State Board of Health and the official county physician to regulate the practice of midwifery for a period of 1 year.

It is the aim of the State Department of Health some day to achieve the now impossible ideal, which is competent medical service and competent prenatal service for every expectant mother in the state.—*North Carolina Health Bulletin*, 48:3–5 (Dec.), 1933.

PUBLIC HEALTH ENGINEERING

THE PRACTICAL APPLICATION OF MILK CONTROL*

J. R. JENNINGS

Chief, Division of Milk Control, City Health Department, Louisville, Ky.

MILK control is extremely young in a modern sense, having as its start the certified milk movement in 1892. It was not until 1907-1910 that states and municipalities considered it of much importance. Since that time, there have been developed three principal types or systems of milk control, namely; the "Scoring" system, the "Force" or "Thou Shalt" system, and the "Grading" system. All are intermingled with variations. I shall attempt here to give the merits of each in the light of my experience.

The scoring system came along about 1903 and was useful in educating the dairy industry and the consumer to the fact that milk needed protection from a sanitary standpoint. However, it was soon discovered that it was lacking in certain fundamentals, particularly in that it did not get results among a large part of the industry, and especially the inferior part. For example, A few producers and distributors, being of a higher type, regularly received a higher score than the remainder. The mediocre and the careless or ignorant ones then became negligent, discouraged, or disgruntled. The inspector was accused of favoring those with a high score and "picking on" those with a low score. When the inspector said to the dairyman: "Your barn floor is filthy today.

You must get that in better condition," the dairyman replied: "Yes, I noticed you scored me down on that the last time, but I have been busy and I get just as much for my milk." This system does not get desirable results because of numerous similar situations both in pasteurization plants and on dairy farms. There is another important weakness in this system. Assume that the pasteurization plant does a poor job of sterilization or the raw distributor has a contaminated water supply, but all other things are complied with. Both are given a score of 97 per cent or 98 per cent—probably the highest scores in the city. Yet both are potentially dangerous. The public is consuming this milk with a false sense of security. These defects then led health authorities to the adoption of the force system.

This system, briefly stated, reads something as follows: "It shall be unlawful for any person, firm, or corporation to sell milk in the City of, unless all of the following items of sanitation are complied with." The items are then listed and are much the same as those appearing on the score card used with the scoring system. Theoretically, this type of control is ideal, but from a practical point, and in all but exceptional cases, it is probably the poorest.

As an illustration, the law or ordinance will require, along with many other items, that the milk plant or

* Read before the Public Health Engineering Section of the American Public Health Association at the Sixty-second Annual Meeting in Indianapolis, Ind., October 19, 1933.

milk house, as the case may be, shall be fly tight and contain no flies. The inspector makes a call and finds the milk bottles covered with flies and proceeds to give the plant foreman or dairyman a warning or perhaps a severe reprimand. On the following visit, the inspector may find things as bad or worse and serves notice that the establishment is "closed up." If the dairyman has influence politically, or if the bank he owes money to has influence, and it frequently has, he will likely be reinstated over the inspector's head.

He may take the matter to court, in which case the inspector may fail to prove that the milk in question has killed anyone or even made anyone sick. The judge or jury in most such cases, will then render a verdict "not guilty," due to the fact that the penalty is too great for the offense.

After having several such experiences, the inspector mumbles to himself, "What's the use?" He knows, and the dairy industry knows, that he is beaten, and he continues with nothing but the persuasion he is able to muster. He finds to his dismay, in many cases, that not only the courts, but the public, and even the law making body that passed the ordinance, will not support him in its enforcement.

If it were not for these things, the force system would succeed more frequently. He also learns that it is not fair and just that a milk distributor be closed up on many of the items specified by the law or ordinance. His own sense of fairness rebels against it. For these reasons the grading system of milk control has come into wide usage during the past 10 years.

The difficulties mentioned happen with much less frequency when the grading system is used, provided several grades are established. If only one grade is established, the program will be worse than the force system, because there is no penalty left except to close

up the distributor. Since in most cases that is impossible, for the reasons given, the "Grade A" cap then appears on low grade milk. The items required in the grading program are much the same as those in the other two systems, but the lower grades are provided for enforcement purposes only. The inspector determines the grade and the housewife does the enforcement.

The distributor soon learns that he must keep a "Grade A" rating or he will lose his business. He would also much prefer a stiff fine in court than to have his competitors know that his grade has been lowered. We may all agree that only the best grade of milk should be sold. In my experience, the simplest, the most speedy, the surest way, and with by far the most harmony between health departments and the industry, to get a good milk supply, is by the use of the grading system. The public, the courts and law making bodies support a program of this type when it is known that the penalty is not the severe treatment of closing a legitimate business, but simply requires that the distributor label his milk according to the degree of safety surrounding its care. The inspector tells the distributor that he has no desire to stop him from selling milk nor to take him to court upon violation of the milk ordinance, but that he must label his milk "Grade C" or "Grade D." When the housewife sees the lower grade rating upon the milk bottle cap or the item in the newspapers, she advises the milkman that she is changing to a "Grade A" dairy.

When the milk grading program was begun in Louisville, conditions were much the same as those existing in most of our metropolitan areas where milk control is inadequate and ineffective. Barns were dark, dirty, and dingy; milk houses were either nonexistent or largely unsatisfactory; equipment was battered and broken and of improper type; and

sanitary methods were little better. Due to a spirit of coöperation engendered into the industry by a competent and tactful application of the grading system, results were accomplished in a period of 4 months that would have been impossible with the scoring or force system. Milking barns became properly constructed, well lighted, and clean. Adequate 2-room milk houses were constructed to accommodate properly the cleaning and storage of equipment, and the cooling and care of the milk. Laboratory facilities were enlarged, and frequent examinations of all milk supplies were made. Pasteurization plants were also put in order including the most modern equipment and methods and were required to handle nothing but graded milk.

This type of control works as well in a town of 1,000 people as it does in the metropolitan areas. It works in a municipality where the temperature is 115° F. in the summer and in another that is snowed under all winter. The only reason it will not work in any part of America is politics.

But no system will bring satisfactory results if enforcement is in the hands of incompetent or uninformed personnel. One of the greatest curses heaped upon milk control agencies is the political patronage thrust upon them. In addition to having a good background, education, and experience, no inspector should be employed who does not have good approach, tact, and ability to work with the dairy industry without

causing unnecessary trouble. Wisely, Louisville milk inspectors have been employed impartially only after thorough written and oral examination.

The objective of both the health department and the industry should be the same—more and better milk. Every health department should let the industry know that when the milk is clean and safe, it will help in educating the public to the necessity for increased milk consumption. To this end our Health Department sponsored a big parade through the business section of the city; 3-minute-picture-trailers were run for a week in all picture shows; window displays were placed throughout the city; a milk pageant was attended by thousands of our citizens; bottle collars bearing a statement by the director of health about milk went out on all milk bottles; a moving picture, made locally, showing the care of milk from the farm to the doorstep was shown to numerous civic groups and schools; many radio talks were made by leading health workers and numberless other things done to acquaint the consumer with our milk supply.

Contrary to the opinion of some, this type of milk control is not more expensive than others. When results are considered, it is less expensive. Our program has been handled at a cost of less than 8 cents per capita annually in Louisville. Direct taxation bears no part of the expense of this service. It is borne by and with the approval of the milk distributors.

FOOD AND NUTRITION

Added Vitamins—Where the nature of a food does not admit of artificial color being used as an indication of high quality, the food is often advertised as being of specially high vitamin content. Instances abound where the name of the product or its description in advertisement implies the possession of high nutritive properties which have little or no foundation in fact.

These things are not quite in the same category as the ordinary commercial advertisement, which habitually exaggerates the value of its wares. They must be looked upon as likely to disturb the normal intake of special ingredients, and so bring dietetics or education propaganda into disrepute, making more difficult the dissemination of sound knowledge on nutrition.

There is a tendency at the present time for manufacturers to avail themselves of the publicity value of recent vitamin research by adding vitamins empirically to a variety of foods without due consideration of the results which may accrue from such haphazard practices. If a halt is not called to this indiscriminate dosing of foods with vitamins there is a possibility of a disturbance in the balance of nutrition which may have wide-reaching effects, and which it is not unreasonable to contemplate with some uneasiness.

Another aspect of the matter is the risk of hypervitaminosis. Although, if the diet is normal and contains a sufficiency of milk, the danger from hypervitaminosis in children would not appear to be great, there is evidence which suggests that, under certain conditions (especially when the diet is lacking in milk or when the calcium intake is high and the phosphorus intake low), the risk of hypervitaminosis has

to be seriously considered. It is not impossible that such conditions might occur in children receiving a faulty diet poor in milk and consuming appreciable quantities of bread dosed with irradiated ergosterol.

There are many other foods which are frequently or consistently debased in quality as a result of competition between manufacturers. It is difficult to say in most cases whether this debasement in "quality" implies actual reduction in nutritive value, or whether the purchaser is prejudiced merely on esthetic grounds, or, because he is not getting precisely what he asks for, or expects to get.—Taken from The Chief Medical Officer's Report, *The Pharmaceutical Journal of Great Britain*, Sept. 23, 1933.

Pellagra—New Theory Concerning Etiology and Treatment—Although pellagra is commonly described as a deficiency disease in which vitamin G plays an important rôle, the exact etiology is unknown. At least one investigator urges caution in ascribing it to vitamin deficiency alone, and this is supported by the observations of several physicians. One of the clinical features of the disease is the pathological changes of a degenerative nature in the intestines which strongly suggests that the absence of a hormone or some unknown factor or factors are responsible.

The author believes that pellagra is probably not an infection, that there is positive evidence of dietary or food insufficiency and a possibility that the colon, ileum and jejunum generate a hormone or a factor essential to normal tissue metabolism.

In view of the degenerative changes

in the intestines, particularly the structural alterations of the colon and ileum, a hypofunctional intestine is suggested. This degenerative tendency is the result of an absence of an unknown factor which results in the absorption and utilization of the mucous membrane of the ileum, jejunum and colon in an effort to secure the metabolic factor. This metabolic principle is designated as X_1 and X_2 pellagra factors.

There exists in the animal gut in the mucosa, soluble, digestible protein-like material and an unrecognized soluble factor designated as " X_2 factor." Dehydrated hog ileum and jejunum were prepared by a manufacturing drug firm by removing the mucosa, by scraping and dehydrating at low temperature with subsequent extraction to remove the fat. The resultant whitish powder is easily mixed with water, milk, orange or tomato juice. It can also be extracted by salt solution (1:5), yielding a fairly thick yellow-red solution. This solution precipitates with alcohol and phenol, resulting in a fine white powder. This powder was used in the treatment of several cases of pellagra and marked improvement resulted in 9 out of 10 patients, particularly reduction of the buccal inflammation and lessening of pain and soreness. There was a cessation of diarrhea where present.

On the basis of these tests, this material appears of definite value and it can be cheaply prepared and easily administered. The author proposed to perfect an extract for intravenous use and to establish the identity of the X_2 factor.—Abstracted from a paper by Jack Clayton Norris which was delivered before the Food and Nutrition Section of the A.P.H.A. at Indianapolis, 1933.

Vitamin C in Citrus Juices—In view of the recent work practically confirming the identity of vitamin C with ascorbic acid as well as the relationship

between the amount of ascorbic acid determined by titration with dichlorophenolindophenol and the antiscorbutic value of the material, a number of experiments were undertaken to determine the degree of natural variation in ascorbic acid content of citrus juices and its resistance to storage conditions. The authors conclude as follows:

1. The method of titration with dichlorophenolindophenol has been applied to the examination of a number of samples of lemon and orange juices, both freshly prepared and preserved in various conditions.

2. It has been found:

- (a) The reducing power of fresh lemon juice is subject to considerable variation, the lowest samples examined having only 60 per cent of the reducing power of the highest.

- (b) The reducing power of orange juice is more constant and rather higher than that of lemon juice.

- (c) The reducing power of both juices does not diminish much in storage in the absence of preservatives, but the use of any preservative which is efficient in preventing fermentation is followed by the gradual diminution of the reducing power which totally disappears in, at most, a few weeks.

- (d) The same result is brought about by strong acidification, pasteurization, or boiling.

3. It is concluded that in untreated juice the reducing factor is protected from atmospheric oxidation by the action of an enzyme, and that when this action is inhibited by any of the usual means the reducing power is rapidly lost.—

Alexander Hutcheon Bennett and David John Tarbert, *Biochem. J.* 27, 4:1294, 1933.

A Deficiency Disorder Induced in Suckling Young Rats Bred on a Purified Synthetic Diet with "Glaxo Casein" (Caseinogen) as Sole Source of Protein—In a previous abstract (*A.J.P.H.* 23:163, Feb., 1933), attention was called to the dietary factor designated "physin" obtained from mammalian liver and not identified with any of the known vitamins. In connection with this work the abnormal behavior of several litters led to

the present experiments to determine the reasons for variation.

Young rats separated at weaning from the stock diet from 4 to 5 weeks were placed on the synthetic basal ration which was fed *ad lib.* After 16 to 20 weeks the animals were mated and during gestation and lactation only synthetic diets were used.

The original diet was modified by substituting "Glaxo casein" (caseinogen) for "light white casein B.D.H." (sodium caseinate). All diets included cod liver oil. On the sodium caseinate diet, while failure of lactation is common, in no case when the mother started to feed the offspring was there failure to rear them successfully, and the young showed good growth rate.

The rats on the caseinogen diet showed the same failure of lactation in many cases. However, the mothers which did start to feed the young were successful in only a small percentage in rearing. The offspring were much undersized in weight compared to the caseinate diet. Definite pathological symptoms were evident on the 24th day.

Added supplements either to the basal

diet or directly to the young offspring were of curative value. Substituting sodium caseinate for caseinogen resulted in complete recovery while the controls died. Extracting the light white casein (caseinogen) with acetone failed to remove all of the factor, but the extracted substance was markedly less effective. Administering the acetone extract resulted in two cases of recovery compared to death of the control animals. Good results were also obtained by feeding a physin extract, resulting in rapid recovery, gain in weight and disappearance of pathological symptoms compared to death in controls not receiving this substance.

No variations in the results of these experiments were noted, either when manganese was added to the diet or when sufficiency of vitamin E was assured. The author discusses the possibility of the identity of physin with the so-called Coward factor. Further studies are to be pursued to eliminate definitely the possibility of protein deficiency or of some toxic substance in the protein.—L. W. Mapson, *Biochem. J.* 27, 4:1061, 1933.

CHILD HYGIENE

INFANT MORTALITY DUE TO RESPIRATORY DISEASES

HAVING noted that infantile mortality due to diseases of the respiratory system, and especially to influenzal broncho-pneumonia, is high, while that caused by digestive troubles is gradually being lowered, the rapporteur considers in particular the banal and influenzal infections of the upper air passages among babies, since efficacious prophylaxis of these diseases is of the utmost importance if we are to reduce mortality from broncho-pneumonia. After recalling briefly the principal clinical signs of catarrhal affections of the upper air passages and of the pharynx—which it is usual to call influenzal affections—and particularly their contagious and epidemic character, he proposes the consideration from the point of view of prophylaxis, of the ensemble of these infections whose etiology, in spite of much research, still remains obscure. He reviews shortly bacteriological research into the common influenzal forms and into pandemic influenza, noting specially the pneumococcus, the streptococci, Pfeiffer's bacillus, the filterable viruses, the *B. pneumosintes*, and the filterable forms of Pfeiffer's bacillus.

Professor Frontali admits the collaboration of diverse microbic species in the different influenzal manifestations. But it is probable that there is some other agent, not yet accurately identified, which plays a fundamental part in lowering the resistance of the respiratory system to the other germs which form its customary flora. It is not possible, however, to exclude the possibility of certain affections of the upper air passages being due primarily to

germs existing in the customary flora. From epidemiological data it may be deduced that this agent is transmitted from the sick to the healthy, from mucosa to mucosa, by atomization of the saliva. The agent makes little resistance to exterior destructive influences. However, instrumental transmission may be admitted to occur from objects freshly soiled. There is no transmission by an unaffected third person; no "carrier" has been discovered. As soon as convalescence sets in, the patient is not contagious.

In connection with the etiological problem Professor Frontali touches on the problem of immunization which has been studied with a view to confirming the data of etiological research (agglutination, fixation of complement, using as antigen the bacillus of Pfeiffer). These latter reactions appear positive during illness and convalescence in adults and children of more than 6 years, more frequently than in children of from 1 to 5 years. Systematic research with regard to other germs, at regular intervals after convalescence, is to be encouraged.

In influenzal affections, one observes, generally, a cyclic evolution which makes one think of a possible important reaction making for immunization. But from the clinical point of view it is impossible to admit the existence, in influenzal affections among little children, either of permanent immunity or of immunity for any length of time. Influenza may repeat in a baby treated in hospital at intervals of from 2 to 5 weeks. From the clinical standpoint we must look upon immunity-resistance following an attack of influenza as ex-

tremely problematic, and in any case as being of short duration.

The rapporteur then notes the *tendency* of the mucosa of the upper air passages when attacked by a virus to give rise to an infection. The anti-bacterial and vibratile defenses of the pituitary mucosa may be modified, directly or indirectly, by many influences, such as chill, over heating, the super-dry air of centrally heated rooms in winter, the inhalation of irritating dust or vapor, and so offer diminished resistance to the customary flora or to the specific agent of influenza. The same influences may cause a congestion favorable to bacterial invasion of the mucosa or of the sub-mucosa—cavernous tissue rich in blood.

Climatic conditions, by acting on the local and general resistance of the organism, and probably also on the biological conditions (virulence) of the microbes in question, play a highly important part in the frequency of influenzal attacks during the different months of the year. (Here follow certain statistical and climatological data.)

Susceptibility to influenzal affections varies with age. The generally admitted low frequency of these affections in the newly-born, and during the first 2 or 3 years of life, may be explained by the anatomic conditions of the mucosa and by the *eutrophia* assured by breast-feeding usual at this time. The importance of the passage of antibodies from the mother to the fetus through the placenta, or to the baby by the mother's milk must not be exaggerated, when we reflect on the relatively short duration (weeks or months only) of the immunity that the greater number of influenzal affections assure even to adults. With the exception of this early period, influenzal affections occur more often, as is shown by statistics, in the first and second year than in the following years of childhood.

The alimentary factor has considerable influence on the predisposition to influenzal affections in early childhood, on the frequency of such affections, and especially on their gravity and prognosis. These infections, statistics show, are less frequent, and in particular less serious, in the well-nourished breast-fed baby than in the normal artificially fed baby, while they are a grave danger for the bottle-fed baby that suffers from nutrition troubles.

Professor Frontali does not hesitate to affirm that a well considered system of artificial feeding rich in fats (particularly, in his oleofarinaceous food) assures better resistance than that obtained by preparations poor in fats and rich in carbohydrates.

Shortage of the liposoluble A (anti-xerophthalmic) leads to anatomical changes in the mucosa of the conjunctiva and the upper air passages with a patent reduction of resistance to various infections. The exhibition of factor B (anti-beriberic) exercises a well known influence on the whole metabolism of growing organisms, but particularly, according to Professor Frontali's personal experience, on the metabolism of fats by increasing their tolerability.

The latent and effaced forms of the lack of factor C (antiscorbutic) are accompanied by a distinctive dysergy to infections of the upper air passages. The tests (capillary fragility, capillaroscopic appearances) proposed by Professor Frontali show that the latent and effaced forms of infantile scurvy are not infrequent among artificially fed children.

Rickets, considered by many to be a D avitaminosis, is accompanied by an admitted predisposition to infections of the air passages, linked in part to deformations of the thorax and to changes in the respiratory mechanism. These infections in turn aggravate the conditions of avitaminosis in general, and in particular those that make for rickets.

In the pathology of early childhood avitaminoses and infections of the air passages form a vicious circle, accounting for the frequent coincidence of rhinopharyngitis, bronchitis, and bronchopneumonia with rickets, scurvy (manifest, effaced or latent) and xerophthalmia.

From the acquired predisposing factors just considered, Professor Frontali passes to the strictly individual and family constitutional factors (exudative diathesis of Czerny, angioneuroses, endotheliopathy—studied by the rapporteur in its capillary manifestations—adenoids, allergy), which may explain certain chronic infections, with frequent recurrence of acute crises and specific manifestations without apparent reinfection by other sufferers.

These considerations concerning exudative, lymphatic and adenoid subjects hold good for subjects in whom to the congenital constitution is superadded a tubercular infection, that is to say, scrofulous subjects. Certain morbid conditions, such as convalescence following on debilitating illnesses not caused by nutritional trouble, also exert a considerable predisposing influence.

In general, the frequency and importance of upper air passage infections are, for the practitioner, a *test* of the general resistance of the child, as they are also in the case of the aged.

Starting from the foregoing observations, Professor Frontali makes the following suggestions for the prophylaxis of these diseases, suggestions aiming at (a) avoidance of contagion, and (b) opposition of the most vigorous resistance by the infantile organism to inevitable infection.

(a) Mechanical protection of the child at the point of origin of the infection, as soon as the first stages of the disease are recognized. The fountain-head of the infection may be the mother or the nurse. The question of con-

tinuing breast-feeding by the mother or nurse suffering from influenza is settled in the affirmative, due precautions being taken—contact limited to the feeding time, previous washing of the breast, use of a gauze mask. This case is, theoretically, the only one in which an adult suffering from coryza or influenza should come near an infant; but in practice it is not easy to dispense from the care of a child, healthy or sick, whether in institution or hospital, in the family circle or at school, everybody suffering from even the mildest form of rhino-pharyngitis which may give rise to influenzal infection.

However, parents, informed of the danger, can attempt to segregate the healthy child from the persons affected; they ought to know the usefulness of the gauze mask and the method of employing it. The education of teachers and of the staffs of children's institutions (especially those for babies) should lead to the adult sufferer himself, at the very outset, declaring the disease, even when it is slight (care being taken to prevent the sufferer from keeping silence through fear of consequences, such as dismissal for reasons of delicate health). Decisions taken by the director of an institution will vary with the case (for cases of afebrile coryzas in homes, creches, hospitals), the use of the gauze mask; for feverish influenzal cases, cessation of service until complete cure.

In hospitals and other institutions for children, transmission from the sick child to his neighbors in adjacent cots can only be avoided by the individualization of personal effects, and by a certain distance being maintained between cots (about 4½ feet). Impermeable and transparent partitions of glass or even cellophane, about 8 feet high, are necessary. The system of individual open boxes is indispensable in every institution that receives children under 2 years.

(b) Habituation to climatic conditions: For all normal children, and more particularly for children constitutionally vasolabile, exudative, and disposed to colds, life in the open air provides excellent exercise of the mechanism charged with adapting the organism to weather variations. This treatment is to be completed by hydrotherapy, massage, active and passive movements and gymnastics from early childhood.

Climatological study, not only physical but biological and medical, of the atmospheric conditions that favor influenzal affections, is greatly to be desired. Such a study would permit us to recognize more exactly the conditions that contraindicate the going-out of children (damp cold, etc.). In this connection Professor Frontali suggests the creation of special observatories, to be attached to university pediatric clinics, and staffed by climatologists who would have a certain interest in working with pediatricians. Study of harmful conditions prevailing in closed rooms will lead to their bettering, by regulating the renewing of the air, the heating, the degree of humidity, and in the countries where it is necessary the cooling of the air.

Feeding—Breast feeding during the first year guarantees resistance to influenzal affections and their more important complications. After weaning the nutrition problem must be solved by the pediatrician and the family doctor, due regard being paid to the influence of proper feeding on the general power of resistance of the child (importance of alimentary fats rightly used, of the liposolubles A and D, and of the anti-scorbutic and anti-beriberic factors in avoiding all possibility of dysergy by avitaminosis).

To be well nourished is one of the fundamental conditions necessary for reducing influenzal attacks to a minimum. One must try to maintain this condition as far as possible by a bal-

anced, complete diet, even during illness of long duration.

Vaccino-prophylaxis—This question is at the point where a solution must be sought in connection with a solution of the etiological problem or problems. Polyvaccines (B. de Pfeiffer, pneumococcus, diplococcus catarrhalis, streptococcus) have been tried, by the rapporteur among others, with encouraging results.

Medicamental prophylaxis—(1) General—Salicylates, aspirine, pyramidon, quinine have not given, in regard to frequency of attacks or to complications, sufficiently convincing results; while treatment by iodine, arsenic, cod liver oil and sea air, in the case of exudativo-lymphatic and scrofulous subjects, are of patent utility since they help to diminish the predisposition to catarrhal affections.

(2) Local—It would be impossible to draw up a list of the topical remedies which have been proposed (nasal instillations, pharyngeal pulverizations, etc.), with a view to disinfecting, cleansing, washing, and rendering more resistant predisposed mucosa. Where such remedies have been used to prevent the diffusion of infection in a collectivity of children, the results have not been heartening. Inhalation of iodine salts is certainly indicated in lymphatic subjects predisposed to catarrh, more particularly in the second period of childhood.

General and local prophylaxis by medicaments find their use in the treatment of lymphatic and scrofulous subjects rather than in the general fight against influenzal affections of early childhood. — Prof. G. Frontali — La profilassi individuale e collettiva verso le effezioni influenzali della prima infanzia. Association Internationale de Pédiatrie Préventive (Section Médicale de l'Union Internationale de Secours aux Enfants), Troisième Conférence, Luxembourg. les 27 et 28 septembre 1933.

PUBLIC HEALTH NURSING*

The First C.W.S.A. Nursing Project in Indiana—As soon as it was announced that women would have a chance at C.W.S.A. jobs, the wideawake superintendent of schools in one of our populous counties in which there had never been a county public health nursing service sent in a project calling for 8 nurses to do school health work.

In the meantime the State Commission on Unemployment Relief responsible for the Indiana Civil Works Administration, having already received many inquiries about the employment of nurses, chiefly for public health, appointed a committee to approve nursing projects and nurses' applications for them. The executive secretary of the State Tuberculosis Association was made chairman; other members of the committee were the executive secretary of the State Nurses' Association and the Director of the State Bureau of Public Health Nursing.

The newly formed committee met at once with the newly appointed director of women's work in the State House and approved the above project calling for 8 nurses. A form of application was drawn up by the chairman of the nursing committee, which decided that a nurse was not eligible for a C.W.S.A. position unless she was registered in Indiana or had a permit to practice nursing here pending registration. The committee was also firm in the principle that every nursing service developed should have competent nurse supervision.

With these principles in mind the assistant director of the State Bureau for

Public Health Nursing visited the county asking for the 8 nurses, to see that the plan was carried out. A competent local public health nurse was found whose economic status enabled her to be approved by the local social worker representing the State Civil Works Administration. The local registrar of the Nurses' Directory checked up on the professional qualifications of the nurse applicants with assistance from the office of the State Nurses' Association.

Within a few hours after the state had wired the county superintendent of schools who sponsored the project (which had been approved by the local County C. W. S. Administrator), 7 of the 8 nurses were on hand with their supervisor and were holding a 2-day institute to initiate them into school health work. The details of instruction for the institute had been worked out with the supervisor of nurses by the nurse from the State Bureau of Public Health Nursing, who on the day before had accompanied the supervisor and the superintendent of schools to a meeting with the officers of the local county medical society who already constituted the Medical Advisory Committee for the local Public Health Nursing Association. She was supplied with standing orders for school nurses, worked out by one of our prominent school physicians, the *Manual of Public Health Nursing* (2nd ed.) and the American Red Cross *Rural School Nursing*. Rules and regulations for the school nurses were worked out by the medical advisory committee with aforementioned standing orders to guide them.

Ways and means of equipping the

* Please send printed matter or other material relating to public health nursing to Eva F. MacDougall, 6 State House Annex, Indianapolis, Ind.

school nurses were worked out. It was decided that white uniforms were expensive to launder and were not suitable for public health nursing. The staff decided they would wear the regulation blue public health nurse's uniform. They bought a bolt of cloth together, and uniforms were made by members of their families or the nurses themselves. Each nurse furnished a bag of some kind and made a washable lining to hold the few bottles necessary for soap, alcohol, etc.

The following week a project was filed for two additional nurses for this county to work under the same nurse supervisor. It was approved. On December 12 the nursing supervisor wrote to the assistant director: "Our nurses went out to the schools this morning, uniforms, bags, and all. The getting ready has been real interesting and not so terribly hard, thanks to you for the splendid outlines and notations."

The following week the secretary of the State Medical Association called up saying the secretary of the Vigo County Medical Society had sent in a copy of the rules and regulations the local medical advisory committee (of which he was a member) had drawn up for the new rural public health nurses. After a conference with the Bureau of Public Health Nursing Staff, the State Secretary decided to mimeograph them and with a letter send them out to each county medical society secretary in the state.

Since so many counties were asking for public health nurses, who necessarily were unqualified for public health work and since the State C.W.S.A. Nursing Project Committee decided there should be competent nurse supervision for all nursing projects, the State Bureau of Public Health Nursing had a project approved to add 3 advisory nurses to its staff. They are all qualified public health nurses who have had county nursing experience. Each is assigned a

district of the state; each drives her own car and pays her own expenses. So far they have been gratefully received by the new nurses, their sponsors, the secretaries of the local medical societies, and the local health officers.

To date, 111 nurses have been employed in hospitals and in public health work on C.W.S.A. projects in Indiana. More are constantly being assigned as new projects come up.

Public health nurses are in demand for immunization work sponsored by the state and local medical societies and for a sanitation campaign being put on in southern Indiana. There is getting to be a scarcity of local nurses to man the nursing projects. E. F. M.

Red Cross Nurse Receives Florence Nightingale Medal—A Florence Nightingale medal, accompanied with a citation on vellum, has again been awarded to a member of the national staff of the American Red Cross, this time to Charlotte M. Heilman, R.N., assistant national director of the Red Cross public health nursing service. The award is made annually by the International Committee of the Red Cross at Geneva to graduate nurses who have won special distinction in the care of the sick and wounded in war or disaster.

It was at the meeting of the International Red Cross in London in 1907 that the idea of honoring the founder of modern nursing with a commemorative medal was first proposed. Miss Nightingale, who was then alive, was pleased to assent, and at the following International conference, held in Washington, D. C., in 1912, the plan was unanimously adopted. Although proposed by the Hungarian delegates, it was the American delegates who caused the award to be restricted to graduate nurses. At that time nursing schools were rare in Continental Europe although not in England, and were un-

known in Central Europe. Provision was then made for 6 medals to be given to nurses of outstanding achievements, the number to be increased to 12 in the event of war. However, before any awards could be made the Great War occurred.

Mrs. Heilman's services attracted international attention during the war and after. Born and educated in West Virginia, she graduated from the Johns Hopkins training school in 1908, and accepted a place in the Trudeau Sanatorium, and later became educational secretary for the Tuberculosis League of Pittsburgh. She then married an engineer whose work took them to South America. When widowed, she returned to nursing and social work at Bound Brook, N. J. When the United States entered the war in 1917, she was assigned to the American Red Cross Commission in Italy, where she served both at the front and in the hospitals in Sicily and the island of Chioggia. After the armistice she engaged in tuberculosis work in Italy, and in 1920 was transferred to Serbia for child welfare work for several months, and then to Greece with its great refugee problem. In coöperation with the Patriotic League of Greece she organized child welfare work and served as director of nursing in the American Red Cross relief of refugees that followed the burning of Smyrna. She also assisted in forming the National Society of Nurses in Greece. In recognition of her work, she was decorated by the king in public ceremonies at Athens. Her European service ended in July, 1923.

Returning to the United States, Mrs. Heilman continued with the Red Cross. Her first assignment was to Santa Domingo, where she developed an excellent program in home hygiene for

the native women. In 1925, she was assigned as nursing field representative for Florida and Georgia and gave service in the great Florida hurricane of 1926. After periods of similar service in the states of New York and Kentucky, she was transferred to the Red Cross headquarters in Washington, D. C., as assistant director of public health nursing.

When the International Red Cross Committee met last April, the greatest National Red Cross Societies put forward 35 nurses as candidates for the medal. When the credentials of all were examined an award of 28 medals was made. The American medal went to Mrs. Heilman in recognition of her work in the war and post-war periods in Europe and in disasters in the United States.

Twelve nurses connected with the American Red Cross had previously been honored with this medal. However, Mrs. Heilman was the first to receive the medal in the presence of members of the Central Committee, or central governing body of the society. This was done on December 13 at the National Red Cross headquarters in Washington.

The other Red Cross nurses to wear the Nightingale medal are: Miss Clara D. Noyes, national director of the American Red Cross nursing service, Elizabeth Gordon Fox, formerly director of the Red Cross public health nursing service, but now head of the visiting nurses of New Haven, Conn., Alma E. Foerster, Florence M. Johnson, Martha M. Russell, Helen Scott Hay, Mary E. Gladiom, Linda K. Meirs, Carrie Hall, Julia C. Stimson, Lucy Minnegerode, and Alice Fitzgerald.—Release from American Red Cross, Washington, D. C., Dec. 5, 1933.

EDUCATION AND PUBLICITY*

I HEREBY PROMISE

I hereby promise that during 1934 when I learn about a good piece of work in public health education, or see a sample of good public health education material, that I will send a postal card or brief letter of appreciation to the responsible health worker or health agency.

I promise, also, that I will write to the editor when a magazine or newspaper publishes a good article on public health.

Two Dead—One Missing—A publication widely circulated among high school teachers lists 9 sources for securing information about exhibits and other materials. Two have been out of print 2 years or longer. Mail to another comes back marked "Not here." The more one uses published lists of sources the greater the conviction that the interests of users of lists can be guarded only through confirmation of all sources except possibly references to standard texts. A copy of the full reference sent by mail would result in any needed correction of the address as well as other changes.

Judging from out-of-date references noted in recently published lists it is not safe to assume that a pamphlet published a year or two ago is now in print.

'How Much Do They Know?—"P.P.J.," speaking editorially in *Journal of the Outdoor Life*:

"There is abundant evidence that the process of education carried on through" many mediums "has had results."

And yet the average man, even one who is recognized as being well educated, when

asked to tell what he knows about tuberculosis, will give an astonishingly ignorant answer. There still remains a woeful lack of knowledge concerning these matters, and this seems to us, who work in the tuberculosis field, to be most discouraging.

If, however, as all agree, knowledge gives a person the ability to make choices, how can we hope in such a vital matter as the early diagnosis of tuberculosis to get people to go to their doctors until they know the basic facts about the disease? Many people can be found who, as a result of radio and other advertising, believe implicitly in some brand of tooth paste, some food or drug designed to produce beauty and health for a mere dollar bill; but few of these people realize that every case of tuberculosis comes from another, and that there are certain well known danger signs that indicate the presence and activity of the disease.

"P.P.J." does not attempt to tell what to do about it. The answer seems to rest upon the doing of more and better educational work among both children and adults.

How Difficult Is Truth—Several years back, weeks of study and conference were needed to produce statements for an anti-diphtheria poster—statements that would be scientifically true, and at the same time clear and convincing to the parent.

Recently one of our health departments published the following:

* Please address questions, samples of printed matter, criticism of anything which appears herein, etc., to Evart G. Routzahn, 130 East 22d St., New York, N. Y.

A case receiving sufficient serum on the first day of illness invariably recovers.

Submitting this paragraph to our own Court of Final Resort we received the following:

The judgment of experts is that this statement is unwarranted. The best that can be said is that less than 1 per cent will die of diphtheria.

Who is right? Or, who is sufficiently right to be safe in making public statements?

Why Not Make Your Own?—Why not make and use lantern slides more freely? In staff conferences and board meetings, as well as in gatherings of supporters and of the general public, slides, even a single slide, may make a point or register a fact. And do it more quickly and more vividly than many words expressed by a speaker.

Agencies working with the schools may wish to supply slides for classroom use, or pass on information to the teachers about making their own slides. The making of slides as a classroom project is one of the newer developments in visual instruction.

Practical information for teacher or health worker is given in "Making Lantern Slides: With a Camera—Without a Camera," a 7-page memorandum issued by Social Work Publicity Council, 130 East 22d St., New York, N. Y. 6 cents.

The headings include:

Why use of slides is questioned; where slides may be used; by welfare and health agencies; in schools; coöperation with school visual education leaders; helps in making slides, including how to get simple information on use of pencils, pens, paper cut-outs, cellophane, and how to make them at no cost at all; film slides or film strips; still films; reducing weight of slides.

Advertising in the School Room?—What types of materials are acceptable and what are unacceptable as the

contribution of commercial firms who supply helps for classroom use in teaching health?

Many and fervid are the objections voiced against much of the advertising served with radio entertainment. But apparently few parents or teachers seem to question the extensive introduction of advertising into the classroom. And much of what is supposed to serve health education is predominantly the advertising of specific products.

Is education to be less carefully scrutinized than entertainment?

A State-Wide Program—One of the good pieces of work in developing well directed coöperation from lay organizations is that done by Mrs. Marie Kirwan, Committee on Tuberculosis and Health, S.C.A.A., 105 E. 22d St., New York, N. Y. The latest step is the formulation of "Suggestions as to a Health Program," issued by the New York State Federation of Home Bureaus. The material appears under: aims; county health department; prevention of communicable diseases; maternal and infant hygiene; yearly health examinations; and sources of further information.

The "Suggestions" may be secured from Mrs. Edward Eddy, College of Home Economics, Ithaca, N. Y. 10 cents.

The Latest Book on Publicity—"How to Do Publicity," by Raymond O. Mayer, contains helpful information, although it is written largely from the standpoint of national distribution of publicity. The chapter on "The County Weekly and Publicity" will help state and county workers. Its chief value to public health workers is the picture it gives of the varied forms and mediums for spreading information. The book cannot meet the promise of the jacket: "It will be valuable in solving every kind of publicity prob-

lem." But Harper and Brother, New York, N. Y., will be glad to send a copy for examination. 272 pages. \$3.00.

Complications for Readers — A state health association mentions two publications of the U. S. Office of Education at 5 cents each. The address for ordering one of them is given as U. S. Office of Education, Washington, D. C.; address for the other, Superintendent of Documents, Washington. This means writing two letters, yet both should be ordered from the Superintendent of Documents. In a second bulletin from the same source one address reads: Superintendent of Documents, U. S. Government Printing Office, Washington, D. C. This is needlessly long. The "Government Printing Office" does print the publications, but the "Superintendent of Documents" is the selling agent for nearly all United States Government publications.

The Practice of Preventive Medicine—*The Health Examiner* is a miniature magazine, "devoted to individual preventive medicine," published by New York Academy of Medicine, 2 East 103d St., New York, N. Y. It should be a form of service by health workers to physicians to bring this journal to their attention. 10 cents an issue. *Sample copies free.*

The Dec., 1933, issue is devoted to "The Practice of Preventive Medicine by the Private Practitioner," by Iago Galdston, M.D. This is source material of value to those who write or speak on preventive practice. *Especially important are the observations on the true values of the health examination.* A foreword states that the article

. . . appeals wisely to the profession to educate the public to look upon his medical adviser as a steady mentor for every member of the family and not merely as a consultant in the emergencies of disease.

A Diet Teaching Device—"Food models in natural size and color," now available, are printed in three colors on tough cardboard, each model carrying on the back an analysis of the food values represented. The collection of 123 models supplies material for illustrating normal and abnormal diets. Duplicates are provided of such foods as milk and butter which the instructor may wish to repeat when displaying a group of meals at one time.

The reproductions are to be cut out, mounted in slots in small wooden blocks or otherwise, and displayed in any desired combination. \$3.00 a set; less in quantity.

Two posters showing groups of fresh fruits and vegetables containing 5 per cent and 10 per cent carbohydrates, respectively, are offered for those interested in abnormal diets. \$1.00 each.

An illustrated folder will be supplied by the Detroit Dairy and Food Council, 910 Stephenson Bldg., Detroit, Mich.

Hygeia, January, 1934—"The Advertising of Foods, Drugs and Cosmetics"; "The Job of Being a Parent"; "Give Your Doctor a Break"; "Courageous Fear—The Mother of Safety"; "Health Pursuits in Pictures"; "High Lights on Low Blood Pressure"; "Foot Comfort"; "Mysteries of Vision"; "Tooth Decay"; "Human Nature"; "Windows to the World of Hobbies"; "Sex Education: The Mating Period"; "When Science Came to Lost Creek"; "Healthgrams"; "Before Baby Is Two: Helping the Baby to Build Healthful Ways of Acting"; "Feminine Beautification" (Part 3); "Years of Progress in the Home"; "A Housewife Looks at the Committee on Foods: Breakfast Cereals"; "Training for Athletics and Health: Training for Track"; "The Gift a King Accepts" (a children's play); "I Want to Know: What Hap-

pens When You Breathe"; "New Books on Health"; "School and Health," including "A New Program for 1934"; "What Shall We Teach?"; "Teachers and Mothers Work Together in Studying Health"; "The School Child's Day in the Home"; "Correlating Health Examinations With Class Teaching"; "A Bibliography for Solving Health Education Problems." *Hygeia*, American Medical Association, 535 N. Dearborn St., Chicago, Ill. 25 cents. Sample free.

When as Well as Who—The hang-over of 19th century ideas is a prime obstacle to 20th century health teaching. Ideas current no longer than a decade ago are not the least of our difficulties. Outmoded printed matter embalms outmoded ideas as to health and hygiene. Sales resulting from printed advertising issued years ago are reported in advertising journals.

There is no time limit to the selling life of an advertisement. Is it likely that all of our outmoded health education printed matter automatically fades away after a year or two?

And yet much of our health education printed matter carries no date—no warning signal even for the more intelligent and thoughtful. Should not all scientific matter in printed form be dated? And, therefore, all information or advice about health and hygiene? Need we list all of the reasons? Of course the date need not be conspicuous. It seems sufficient that it may be found readily and read easily.

Reprints from scientific journals and other periodicals sometimes give only volume and page numbers. The addition of dates is as an added service to the reader and student.

Education Concerning Obstetrics—*Journal of Indiana State Medical Assn.* (Dec., 1933) offers the following 11-point program:

1. Seventeen to 20 thousand women die annually in the United States of the child-bearing process.

2. Educate the laity that one-third of these are due to sepsis; one-third to toxemia; and that nearly all sepsis deaths and nearly all toxemia deaths should be prevented.

3. This should not be used in the nature of a scare, but rather as statistical facts showing what good obstetrics can do.

4. Educate men to know the importance of the childbearing process.

5. Educate women to go to the doctor early in pregnancy. Educate them to select a doctor known to give good care in obstetric cases and to go regularly to see him.

6. Educate women as to what good obstetric care means.

7. Educate them as to diet, exercise, sleep, rest, and general prenatal care.

8. Educate them as to delivery care and what constitutes good care.

9. Educate them as to good after-care.

10. Educate them that all pregnant women need good care throughout pregnancy, labor, and puerperium.

11. Educate them that the best American stock is decreasing and that motherhood should be one of woman's greatest hopes, and if the mother is properly cared for during childbearing there should be little to fear.

The Healthmobile in Germany—From Dr. W. W. Peter comes this account of the healthmobile of the Deutsches Hygiene Museum of Dresden:

The crew consists of two men. One, an expert mechanic who drives and maintains the truck, the electric lighting plant, the slide and cinema projecting machines. The other is a man who has worked for some years in the Deutsches Hygiene Museum, is able to explain all of the exhibit which is not already self explanatory, gives the lectures prepared by or under the direction of Dr. Weisbach, and attends to the business side of the work. These two men can unload the exhibit, measure off the area, set up the tent, string the electric wiring with lights, erect the partitions, set up the shelves around the booths, place the exhibit, arrange the benches, build the platform, and have the whole place ready for the first visitors in the remarkably short time of 3½ hours. Then on the last day in a place, when the last visitors leave at 10 o'clock, by 1 the next morning everything has been taken down and packed inside or under tarpaulins on the roof ready for an early

start. These two men are healthy specimens, sun-tanned, always neatly dressed and with pleasing personalities. One of them is also an amateur photographer.

On entering the tent one passes the ticket table where admission fees or previously secured tickets are surrendered. By day the inside of the tent is lighted and ventilated by flap skylights which can be pulled down in rainy weather. The rear end of the truck houses the projection apparatus. The pictures are thrown in reverse from within the truck to the screen at the very end. The screen also is shielded by canvas so that daylight projection is made possible. At the tail end of the truck is the platform with a businesslike speakers' table.

In the middle of the tent are two rows of benches without backs. There are 10 benches in a row and each bench seats 5 persons if they are not too fat. Around the sides and rear are the booths housing 10 subjects visualized. Over each booth is a strong, shielded electric light. One hundred and sixty more people can stand in the aisles and in the booths and see the speaker when a meeting is under way. Some of the booths have shelves along three sides. These are made of the packing boxes which house exhibit material. The entire enclosed area measures 15 x 25 meters.

There are 10 subjects visualized and explained by captions:

1. Protection of Life and Health, in industry and transportation with instructions on First Aid.

2. Accident Prevention in Home and Land on the Farms. Has a section on flies and mosquitoes. There is a caption reading "Kill the Flies, or They Will Kill You."

3. Prevention of Traffic Accidents in Country and Town. Has also a section on fire prevention.

4. Venereal Diseases. This booth is in the corner behind curtains on which is a sign "For Adults Only." Have a health examination before marriage. Physical and mental consequences of syphilis. Plastic models.

5. Protection of Children Against Crippling.

6. Campaign Against Communicable Diseases. Plastic models. Charts.

7. Health and Work. Illustrations of how sickness interferes with working ability. Dust. Gases. Cleanliness.

8. Milk. Its proper preparation, handling, and use.

- 9 & 10. Protection Against Air raids.

On each of the several tent poles marking also the end of each partition there is suspended a 3' x 4' glass covered box for transilluminating pictures of the human body

—the skeleton, the muscular system, the nervous system, and the circulatory system. There are also some beautiful anatomical preparations made by the Spaldeholz method showing various organs of the body—the heart, the lungs, bones, intestines, brain, etc.

The Healthmobile stays in a place for 1 to 3 days. The jumps are never too far apart. The towns are arranged on a schedule and the Burgomeisters notified. In so far as possible, Dr. Weisbach visits the officials beforehand and explains what this new thing is all about. He leaves the leaflets, What the Hygiene Auto Wants and Offers, as well as announcement posters and direction cards. The local officials do the rest. They find a suitable place, often in the market square. They notify the newspaper if there is one, the schools, and in other ways work up an interest in what is to come on a given date.

CAMPAIGNS

The liveliest of campaign bulletins (that we have seen) is *The Early Bird* ("catches the worm—and early diagnosis discovers 'The Bug'"), which happens to be the promotion bulletin for Early Diagnosis Campaign in New York State. Issued by State Charities Aid Assn., 105 East 22d St., New York, N. Y.; mimeographed, with simple but illustrative sketches.

"Diphtheria Immunization Campaign" outlines the plan for a statewide effort the first week of December, 1933, sponsored by the Indiana State Medical Assn., with the coöperation of numerous lay organizations. *Journal of I.S.M.A.*, 1021 Hume-Mansur Bldg., Indianapolis, Ind. Dec., 1933. 50 cents.

FOR REFERENCE AND EDUCATION

"Malaria," New York State Dept. of Health, Albany, N. Y. 2-page leaflet. Prevention, and if you have it.

"Organizing a Rural Preschool Conference." Reprint from *Public Health Nursing*. N.O.P.H.N., 450 7th Ave., New York, N. Y. 4 pages. 10 cents; 3 for 25 cents.

"A Study Program for School Nurses" is started in the Dec., 1933, issue of *Public Health Nursing*, 450-

7th Ave., New York, N. Y. Reprints, 10 cents for each month. The opening lesson takes up "The Nurse and the School Health Program."

"Suggestions for Reading in Public Health Nursing." Publications list of National Organization for Public Health Nursing, 450 7th Ave., New York, N. Y. 6 pages. *Free*. Classified as general, education, organization and community problems, records, supervision, tuberculosis, nursing, industrial nursing, mental hygiene, social hygiene, maternity and child health, school nursing and health education, nutrition, hourly appointment service, publicity helps and materials.

"What Builds Babies?" by Children's Bureau, Washington. Revised. Sold by Supt. of Documents, Washington, D. C. 8 pages. 5 cents. Mother's diet.

"What Science Knows About Cancer," by E. C. Cutler, and "Progress Against Cancer," by Ludvig Hektoen. American Medical Assn., 535 N. Dearborn St., Chicago, Ill. Reprints from *Hygeia*. 10 and 8 pages. 10 cents each; 5 or more copies, 8 cents each.

The following from National Society for Prevention of Blindness, 450 7th Ave., New York, N. Y., are largely reprints from *Sight-Saving Review*:

"What Can an Organization for the Blind Do in Preventing Blindness?" 19 pages. 15 cents.

"Lighting for the Conservation of Vision." 15 pages. 15 cents.

"Non-Shatterable Glass in Spectacles." 2 pages. 5 cents.

"Should Your Child Wear Glasses." From *Hygeia*. 4 pages. 5 cents.

"Eyes and Athletics." Illustrated cover; limited text; for school athletes. 3 pages. 5 cents.

"Pure Cow's Milk for Every Milk Use," by Evaporated Milk Assn., 203 N. Wabash Ave., Chicago. 4-page folder. *Free*. How e.m. may be used.

"The Pursuit of the Vitamins," by

P. B. Mann. General Baking Co., 420 Lexington Ave., New York, N. Y. 16 pages. "What the vitamins do"; nutritional chart.

HEALTH EDUCATION

The following references appear in *Library Index*, National Health Council, 450 7th Ave., New York, N. Y.:

Friendly messengers carrying lessons of health, by M. P. Connally. *Red Cross Courier* (Washington, D. C.) 13:168-69, Dec., 1933.

Accomplishments under an emergency program, by Jennie MacMasters. *Trained Nurse and Hospital Review* (New York) 91:447-54, Nov., 1933.

Classes for prospective fathers, by E. V. Thiehoff, M.D. *Public Health Nursing* (New York) 25:648-49, Dec., 1933.

Health projects; plans for motivating health instruction. *Grade Teacher* (New York) 51:28, 62, Jan., 1934. The doll hospital, by U. B. Truitt; Our fruit project, by I. M. Lenhouts.

MAGAZINE ARTICLES

"An American Conference on Birth Control." *Literary Digest*, New York, N. Y. Dec. 16, 1933. Includes birth rate status, and summary of birth control objections.

"Immunity as the Chief Task of Future Medicine," by Dr. A. Hrdlicka. *Literary Digest*, New York, N. Y. Dec. 9, 1933. "Artificial immunization has already saved innumerable lives."

"The Lean Years," by Lillian D. Wald. *Atlantic Monthly*. Dec., 1933. Social and health aspects of depression as seen from Henry Street.

"Nutrition and Longer Life: the New Knowledge of Foods," by H. C. Sherman. *New York Times*. Dec. 10, 1933. "Diet which aids in fighting the deficiency diseases and improving the level of health."

"Some 'Facts' that Aren't So about Babies," by Dr. W. R. Ramsey. *Farmer's Wife*, St. Paul, Minn. Jan., 1934. "Explodes a few old-fashioned baby welfare notions."

BOOKS AND REPORTS

The Eugenic Predicament—By S. J. Holmes. New York: Harcourt, Brace, 1933. Price, \$2.00.

This is an interesting and authoritative, though rather pessimistic, review of the situation. The author begins with some biological preliminaries and makes his case that our race carries a heavy burden of bad heredity. He is strong in his support of the eugenicist, though recognizing that we find great diversity of opinion even in those who are firmly convinced of the fundamental necessity of work in this field. He is positive in his opinion, and correctly so, we believe, that to be well-born is to possess the greatest of all gifts, while for the ill-born there is nothing which can compensate for the lack of good heredity. He points out that we may swagger as much as we see fit about being masters of our fate and captains of our souls, but when we have drawn our allotment of genes, nothing can greatly further help us, though of course he does not decry education and training.

After laying a foundation, the book ends, as far as the text goes, with a chapter on "What Can We Do About It?" All plans for the improvement of the race come under two heads: (1) those under negative eugenics, whose aim is to eliminate bad heredity; and (2) those under positive eugenics, which is concerned with efforts to increase good heredity. This brings in the question of birth control, concerning which he holds it is quite evident that in spite of the great possibility it possesses as a means of racial improvement, it is a two-edged sword, and so far has been dysgenic. If we could breed from the best 25 per cent of our

hereditary stock, in a few generations we would have a vastly superior society than one bred from the poorest 25 per cent.

He points out further a matter which he has elaborated in one of his former books, *The Trend of the Race*, that under our present social and economic régime there is a correlation between success in life and sterility which has tended to deteriorate the race. He believes that advance can come about only by interesting people in human biology and the development of a genuine and widespread desire for race betterment. At present the eugenic prospect is not hopeful.

An appendix of 34 pages gives many of the facts upon which the opinions are based. This includes a very interesting study of identical twins as regards diseases, mental inferiority, and superior ability. At the end of the book references for each chapter are given, and a good index makes easy reference. The book is well written and can be recommended to all interested in this subject, which perforce affects all of us. The printing and make-up are excellent.

MAZÛCK P. RAVENEL

Oeuvres de Pasteur—*Pasteur Vallery-Radot*. Paris: Masson et Cie. Tome VI, xii+906 pp. 1933. Price, 160 fr.

This sixth volume of the collected works of Louis Pasteur, assembled under the able editorship of Pasteur Vallery-Radot, covers by far the most important period of this great scientist's life. It includes the subject of germ theories, of virulent communicable diseases, the virus-vaccines, and the prophylaxis of rabies. His previous

work led him along a natural path to the attack upon the causative organisms of communicable diseases.

His prevision of this route appears as early as 1859 in a manuscript note. Again in 1860 he predicts the falsity of the idea of the spontaneity of such diseases. In 1862 in a note to the Minister of Public Instruction he invites attention to the probability that the investigation of the diseases of plants and animals will lead ultimately to the solution of the infectious diseases of man. In 1863 in his memoir on putrefaction he refers to his hope that these studies may aid in the solution of those diseases which the physicians of the classic period called the putrid maladies; and a few months later he drew analogies between the diseases of wine and of man. After his solution of silkworm disease and of its mode of transmission from one generation to the next, he appealed to the Emperor for a suitable laboratory in which to carry on adequate experimental investigations on gangrene, on the viruses, and on inoculation.

At the end of 1867 he decided to turn to the domain of pathology and to devote himself to researches on the viruses, to experimental inoculations, and to the study of anthrax. In the meantime Pasteur had been elected to the Academy of Medicine and found himself actively engaged in ardent discussions of putrefaction and fermentation, in destroying the dogma of the spontaneity of disease, in convincing the physicians that spontaneous generation was in reality a chimera, and in controversies over surgical dressings.

It was not until April 30, 1877, twenty years after his first publication on fermentation, in which his method was elaborated, that he published his first memoir on infectious diseases.

From 1877 to 1885 Pasteur and his collaborators, Chamberland, Roux, and Thuillier, carried on, often coincidentally

and uninterruptedly, their researches in elaboration of his germ theory of disease and therapy based thereon. These contributions are segregated by subjects as follows: the applications of the germ theory to medicine and surgery; puerperal fever; furunculosis, and osteomyelitis; the etiology of anthrax and septicemia, and the relation of earthworms to anthrax; and virus vaccines, vaccines for fowl cholera, and for anthrax.

Pasteur's contributions to the subject of attenuation of viruses were summarized by him at the Congress at London in 1881 and at the one at Geneva in 1882. In one chapter are combined the memoirs on the vaccines of fowl cholera and anthrax, on the attenuation of and increase of virulence, notes on the results of vaccination against anthrax, the reply to Koch's criticisms, and his explanations of the miscarriages in anthrax vaccinations in Italy. The papers on variola, the plague, pleuropneumonia of cattle, the etiology and vaccine therapy for hog cholera, and his contributions on cholera, are assembled in separate chapters.

There also are found his communications on rabies to the Congress at Copenhagen in August, 1884, and to the Academy of Sciences at Paris on October 26, 1885, on the method of preventing rabies after the bite, as well as various notes of the results of anti-rabic prophylaxis.

In the last two hundred pages are included various "Documents" concerned with Pasteur's work, including those both of critics and defenders, which elucidate his ideas, and present his own part in the discussions as well as the comment aroused by the public presentation of his work. The hitherto unpublished reports of Pasteur on anthrax to the Conseil d'Hygiene are to be found here.

This volume thus contains all that

Pasteur published on infectious diseases in scientific and medical journals, and in the proceedings of scientific congresses. It closes the cycle of extraordinary activity from 1848 to 1886, in which he was led by an inflexible logic from molecular asymmetry to fermentations and thence to virulent diseases. It contains some of the greatest contributions to science and unquestionably records the greatest boon to humanity of the 19th century.

The meticulous care of the editor is exhibited not only in the accuracy of the reproduction of the original texts and their correction where this is required, but also, and especially in this volume, by the explanatory footnotes with careful citations of the pertinent references. The publishing house of Masson & Cie. has given to this and to the earlier volumes a format and a typography fitting the greatness of their contents.

CHARLES A. KOFOID

Practical Food Inspection. (2 Vols.)

Vol. I. Meat Inspection. Vol. II. Fish, Poultry and Other Foods—*By C. R. A. Martin. London: H. K. Lewis & Co., Inc., 1933. Vol. I, 312 pp. Price, \$4.00. Vol. II, 250 pp. Price, \$3.00.*

Volume I is one of the best books for the inspector which it has been our fortune to run across. Beginning with Physiology and Comparative Anatomy, enough is given of these subjects for the ordinary non-professional inspector to understand as much as he needs of the anatomy of the body and its functions. Histories of slaughter houses and methods of slaughtering are given, followed by the inspection which is necessary. This takes up the usual routine of freshness or decomposition, discoloration, etc.; and then follows a list of the diseases, bacterial and parasitic, which are liable to be found. There are a glossary and a very good index. There is one colored plate giv-

ing illustrations of swine fever and swine erysipelas. The book is abundantly illustrated, and though the drawings are somewhat crude, they are descriptive and useful.

The second follows the general plan of the first volume, giving a short description of anatomy and physiology, and the differences between fish and air breathing vertebrates. This is followed by a description of the principal food fishes, each one of which is illustrated. The section on Poultry and Game follows the same general plan. Fruits and vegetables, including canned foods, are next considered. A section of 50 pages is devoted to Milk and Milk Products. This is very good, but not applicable to our custom here in America. Next come Miscellaneous Foods, Confections, Fermented Liquors, etc., and a short section of Food Poisoning; then a chapter of 35 pages on Legal Procedure. A glossary and index complete the volume.

While both these books are written from the English standpoint, they are practical and official, and though the English methods and legal procedures differ from ours, the books can be recommended for study to all sanitary inspectors and health officers.

MAZÛCK P. RAVENEL

American Red Cross Text-Book on Home Hygiene and Care of the Sick—By Jane A. Delano. 4th ed. Philadelphia: Blakiston, 1933. 391 pp. Price, Cloth, \$1.40. Paper \$.75.

The worth of this textbook is so well established and its use so widespread that any effort to keep it up to date reaches and is appreciated by large numbers of both teachers and students. This last and fourth revision is made in accordance with the new and accepted theories in the prevention of disease and the maintenance of good health. More consideration is given to mental health

and its relation to physical health. Consideration of the newer methods of prevention and control of communicable disease have been substituted for the older less effective methods. Attention is called to the importance of the infant and preschool age in building healthy children and adults. Those responsible for this revision have done a good job in widening the scope and increasing the value of Miss Delano's original contribution to health education.

VIRGINIA A. JONES

The History of Staining—By H. J. Conn. *Published by the Book Service of the Biological Stain Commission, Geneva, N. Y., 1933. Price, \$2.00.*

This book issued under the Chairman of the Commission on Standardization of Biological Stains is interesting and helpful. It adds another debt of gratitude owed by all laboratory workers to this commission. Especially interesting are the biographies of those who were pioneers in the art of staining. This book brings to us fairly complete life histories of many whose names are known to the majority of us only through the stains which they have devised and taught us to use. It should have a place in every laboratory and in libraries.

MAZYCK P. RAVENEL

The Modern Treatment of Syphilis—By Joseph Earle Moore, M.D. *Springfield, Ill.: Thomas, 1933. Price, \$5.00.*

Syphilis is a disease in which, perhaps more than any other, proper treatment plays a tremendous part in prevention, so that we are giving a review of this book, in spite of the fact that its title implies it is entirely clinical. However, all through the book the suppression of the disease has been considered fairly.

While the author has considered the works of others freely and used the ma-

terial obtained in other clinics, this book is based largely upon the study of the 18,000 cases handled at the Syphilis Division of the Medical Clinic at Johns Hopkins Hospital. He divides syphilographers into three groups, the first of which holds that no definite statements can be made as to preferred methods of treatment; the second, that it is worth while to describe the best methods now in use and relate the results attainable, while recognizing their imperfections; and a third which holds that the standardization of treatment for all types of syphilis is not only desirable, but available. To the middle group he claims adherence, and says justly that if perfection were awaited, one might well postpone writing indefinitely. The majority of practitioners will hold with him, and a book such as that before us is a boon to the specialist as well as to the general practitioner who meets the manifestations of syphilis in its many varied forms.

The book is absolutely modern and up to date. He describes therapeutic procedures that have proved their value in the past and the newer ones which are now being tried out and some of which are of recognized value. The author is very cautious in predicting too much of some of the new and spectacular measures, but this attitude impresses one with the dependability of his opinions.

In the clinic, on the material from which he has based his opinions, there is very close coöperation between experts and the different branches of medicine, and the patient is studied and treated from the broadest possible angle.

The sociological side of syphilis is not neglected. The chapter on Syphilis and Marriage strikes us as being eminently sound. It is a question that comes up to the general practitioner frequently, and few can give dogmatic opinions. He discusses post-marital

infection as well as marriage when one or the other party is already infected. The author believes in frankness and points out that if a patient marries with his consent, but without telling the other party of his infection, and if she subsequently becomes infected, the physician is liable to legal proceedings as well as injurious criticism. He holds also that proper treatment depends largely upon both parties knowing the situation, and tells us that divorce under such conditions is not as frequent as might be supposed.

The book is written in a most interesting fashion, shows wide study, and impresses one with its sincerity. The printing is excellent. The illustrations, though few in number, are good. Each chapter ends with a well selected bibliography. We cannot but wish that it had been printed on lighter paper. The work can be recommended unreservedly. DUDLEY A. ROBNETT

Obstetrical Nursing — *By Carolyn Conant Van Blarcom.* New York: Macmillan, 1933. 634 pp. Price, \$3.00.

Here is the third edition of an excellent textbook on the nursing care of the expectant mother, the woman in labor, the young mother and her babe. It has the added advantage of being written by a nurse who has worked with numbers of obstetricians and knows they are apt to employ different methods. She overcomes controversial matters by stating that some physicians prefer one method, others another. For instance, in the care of the nipples of the expectant mother. A physician in a recent book on the same subject says

the nipples should never be hardened: Miss Van Blarcom says there are two general methods: hardening with skin astringents and softening with ointments, and "both seem to be about equally popular." This is very helpful to a young nurse who needs to know that there are more ways than one to do things and get results.

The author is thoroughly up to date on all scientific facts, and brings out some details that other textbooks on the subject have passed over, the relation between ovulation and menstruation, for instance; and the emphasis on the need for great care on the part of the prenatal patient at the time when menstruation would occur if she were not pregnant.

The chapter on the Mental Hygiene of the Expectant Mother is unusually good. Every public health nurse should be drilled on this chapter. It gives her an insight into psychology which she can get in no other place that I know of.

The book is well arranged and follows the recently noted trend of simplification in the care of maternity patients and their infants. Yet every detail that has anything to do with the subject is treated. An interesting chapter is entitled "Community Facilities for Maternity Care." There is a history and development of the Maternity Center Association of New York together with the accomplishments of the present facilities for prenatal, maternal, and child care. There are plenty of illustrations which are modern and to the point. I recommend the book without a single reservation.

EVA F. MACDOUGALL

A SELECTED PUBLIC HEALTH BIBLIOGRAPHY WITH ANNOTATIONS

Changes Needed in Obstetrical Practices—"The hazards of childbirth in New York City are greater than they need be. Responsibility for reducing them rests with the medical profession." Thus concludes the recommendations for improving maternal mortality experience. If the name of the city were omitted, the quotation would be equally and generally valid.

ANON. Maternal Mortality. J.A.M.A. 101, 23:1826 (Dec. 2), 1933.

Do Food Handlers Pass on Their Colds to Us?—Fifteen Johns Hopkins apes were long kept free from respiratory infection. Then they were given food prepared by a person with a common cold. Bliss and Long report that within 48 hours 5 apes developed a coryza and 2 a moderately severe cough.

ANON. Transmission of Colds by Food. J.A.M.A. 101, 26:2054 (Dec. 23), 1933.

Preventing Tetanus with Toxoid—Experimental animal tests with tetanus toxoid showed a high degree of protection and suggest the possibility of producing human immunity against tetanus without creating the hypersensitization against horse serum which the use of tetanus antitoxin entails.

BERGY, D. H. and ETRIS, S. Tetanus Toxoid in Prophylaxis Against Tetanus. J. Prev. Med. 53, 3:331 (Nov.-Dec.), 1933.

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NEWS FROM THE FIELD

DR. JOHN L. RICE, NEW YORK
COMMISSIONER OF HEALTH

MAYOR LaGuardia's appointment of Dr. John L. Rice as Health Commissioner of New York City is in line with his earlier statement of policy regarding the Health Department. On October 21, 1933, the Mayor is quoted in the press as having spoken in part as follows:

It is my intention to economize to the limit, at the expense of political bosses, patronage, and waste, but never at the expense of human life. . . . Since health authorities are all agreed that public health is purchasable, I propose to purchase the best there is for our city, and I intend to get it at reasonable cost, without waste or graft, and I intend to get it right away. . . . A strong, vigorous, honest Health Department, working in harmony with the hospitals and the medical profession is absolutely essential to the well-being of every citizen of New York.

It is noteworthy that Mayor La Guardia explored the field of trained public health administrators without reference to residence, and finally

selected a Commissioner from outside of his own city.

For over 10 years, Dr. Rice has been the Health Officer of New Haven. He has engaged in public health work continuously since his graduation from Johns Hopkins Medical School in 1917, serving with the Rockefeller Foundation, International Health Division, the Kentucky and New York City Departments of Health. In the summer of 1933 he was one of two health officers chosen by the Carl Schurz Foundation of the Oberlaender Trust to visit Central Europe to study public health conditions and control measures.

Dr. Rice is a member of the Executive Board and Governing Council of the Association, and Chairman of the Health Officers Section. He is also President of the Connecticut Public Health Association. Upon his retirement as Health Officer of New Haven, Dr. Rice was elected an honorary member of the New Haven Medical Society. During his administration as Health Officer of New Haven, the effec-

tiveness of the city public health program steadily improved. This city has been awarded first place for 3 years (jointly with Syracuse in 1932), among cities of 100,000 to 250,000 population, in the National Health Conservation Contest sponsored by the U. S. Chamber of Commerce and the American Public Health Association.

DR. LINSLEY R. WILLIAMS

THE tuberculosis movement is immeasurably poorer because of the death of Dr. Linsley R. Williams on January 8 after an illness of several weeks.

Dr. Williams was the third chief executive of the National Tuberculosis Association, assuming the position of managing director in the fall of 1922. For 6 years he directed the destinies of the National Association and helped very materially to shape the course of the Association along sound scientific and financial lines during that critical period.

When in 1914, Dr. Hermann M. Biggs was selected as the first Health Commissioner of the State of New York under the new public health law, he chose Dr. Williams as his deputy commissioner and chief administrative assistant.

At the outbreak of the War, Dr. Williams enlisted and served in various capacities. In 1919, he was called to succeed Dr. Livingston Farrand as director of the Rockefeller Commission on Tuberculosis in France. In this rôle, he developed French resources so effectively that it became possible to organize, wholly under French auspices, a national anti-tuberculosis movement supported by an annual sale of Christmas seals and modeled after the American plan.

In 1922 Dr. Williams accepted the unanimous call of the Board of Directors of the National Tuberculosis Association to become Managing Director,

succeeding Dr. Charles J. Hatfield. In 1928 he resigned to become director of the New York Academy of Medicine. In this position his lifelong interest in and knowledge of political and social affairs in New York City coupled with his medical background, enabled him to influence the medical destinies of the city in ways that will be felt for generations to come. To the physicians of New York he brought not only a sympathetic attitude toward their relations with the individual patient but also a keen understanding of the more advanced social position of the physician in the community. As director of the New York Academy of Medicine and as president of the New York Tuberculosis and Health Association, he was constantly being called into consultation by the medical, public health, and political authorities of the City and State of New York on matters of the greatest fundamental importance dealing with health and social welfare.

P. P. J.

DR. R. L. KAHN AWARDED 1933 SCIENCE PRIZE

THE eleventh annual award of the American Association prize of \$1,000 given by the American Association for the Advancement of Science to the author of a noteworthy paper presented at its winter meeting, was voted to Dr. Reuben L. Kahn, Member A.P.H.A., Professor of Bacteriology at the University of Michigan Medical School, for his paper "Tissue Reactions in Immunity."

During the World War, Dr. Kahn served first as lieutenant and later as captain in the United States Army Sanitary Corps. He is now a major in the Medical Reserve Corps. Since 1928 he has occupied his present position with the University of Michigan Medical School; he is also director of clinical laboratories of the University of Michigan Hospital.

PROF. SHERMAN WINS CHEMISTRY
MEDAL

PROFESSOR Henry C. Sherman, F.A.P.H.A., Mitchill Professor of Chemistry in Columbia University and internationally known for his research and discoveries in vitamins, has been chosen for the William H. Nichols Medal for 1934. This award is presented annually by the New York section of the American Chemical Society.

The medal will be presented to Professor Sherman on March 9 at a meeting of the Chemists' Club.

Established in 1902 for the purpose of stimulating original research in chemistry, the medal this year will go to Professor Sherman for his achievement in vitamin research.

Among the achievements credited to Professor Sherman in collaboration with other chemists is the development of quantitative methods for the determination of vitamins A, B, C and G, which have played a large part in the work of many laboratories upon the concentration, purification or isolation of these particular vitamins.

Professor Sherman has been engaged in research and teaching at Columbia for the last 35 years. In 1924 he was appointed Mitchill Professor of Chemistry. He is senior author of the American Chemical Society's monograph on *The Vitamins*; a research associate of the Carnegie Institution, and a member of the National Academy of Sciences.

GOVERNMENT TO MAKE SURVEY
FOR DEAF

TO determine the types of occupations for which deaf and hard-of-hearing young people can be successfully trained, and to discover employment possibilities for them under Civil Works and Public Works Administrations, is the aim of a survey launched

by the Federal Office of Education through a grant from the Civil Works Administration. This has been announced by the Assistant United States Commissioner of Education.

PERSONALS

S. S. GOLDWATER, M.D., who joined the Association in 1902 and is a Charter Fellow, has been appointed Commissioner of Hospitals of the City of New York.

R. E. WODEHOUSE, M.D., Member A.P.H.A., was recently appointed Deputy Minister of Pensions and National Health in the Canadian Government. He was formerly Executive Secretary of the Canadian Tuberculosis Association. His successor is G. J. Wherrett, M.D., M.R.C.P.

R. W. BRADSHAW, M.D., College Physician, Oberlin College, Oberlin, Ohio, was elected President of the American Student Health Association held in Chicago, December 27-28.

DR. ROBERT P. FISCHER, Member A.P.H.A., Secretary and Chief Chemist of the Board of Pharmacy of the State of New Jersey, and lecturer in Industrial Pharmacy at the Philadelphia College of Pharmacy and Science, has been elected President of the American Pharmaceutical Association for the year 1934-35.

ETIENNE TOTTI, of San Juan, Puerto Rico, member A.P.H.A., was recently appointed by the Hon. Governor Robert H. Gore as a Member of the Insular Board of Health of Puerto Rico.

DR. EUGENE L. BISHOP, Tennessee State Health Commissioner, President-Elect and Life Member A.P.H.A., has been appointed Director of Health for the Tennessee Valley Authority, according to recent newspaper reports.

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Germany's Sterilization Program

W. W. PETER, M.D., DR.P.H., F.A.P.H.A.

ON January 1, 1934, Germany began to put in force a program to sterilize those of her citizens legally adjudged unfit for parenthood. A government announcement states that approximately some 400,000 are to be sterilized in a short time. In a country where law still means as much as it does, where under the present regime orders from the top reach down to the very bottom without the obstruction, delay, detraction, and dilution which minority and opposition parties contribute, yet where nothing of this kind on such a wholesale scale has ever been attempted, where considerable undercover opposition exists, this particular program which Germany has launched merits the attention of all public health workers in other countries. If the objective of eliminating parenthood by those unfit is actually achieved in a thorough but legally and scientifically fair way, Germany will be the first modern nation to have reached a goal toward which other nations are just looking, or approaching at a snail's pace. What will actually happen remains to be seen.

The enabling law on which this program is based was enacted July 14, 1933, and promulgated¹ July 25, to go into effect January 1, 1934. Only once in this law containing 18 sections is the

word "sterilization" used, and then it is in parenthesis. The favorite term often repeated is "unfruitful" (*unfruchtbar*).

The core of the law is contained in the first section. My translation has been checked by a jurist who studied in the United States. It reads:

Those hereditarily sick may be made unfruitful (sterilized) through surgical intervention when, following the experience of medical science, it may be expected with great probability that their offspring may suffer severe physical or mental inherited damages. The hereditary sick, in the sense of this law, is a person who suffers from one of the following diseases: inborn feeble-mindedness, schizophrenia, circular insanity, hereditary epilepsy, hereditary Huntington's chorea, hereditary blindness, hereditary deafness, severe hereditary physical deformity. Further, those may be made unfruitful who suffer from severe alcoholism.

Application for this treatment may be made by the individual and will be received when it is accompanied by a certificate from a national licentiate physician attesting that the applicant has been instructed concerning the nature and the consequences of this operation. For those legally incapable of managing their own affairs, guardians, courts, legal representatives, and trustees may make application. This procedure may also be proposed by medical officers in official health organizations, and by

superintendents of hospitals, of medical institutions, of insane asylums, and of prisons on behalf of inmates.

To avoid miscarriage of justice, there are a number of important safeguards included. The most important of these is the decision of the government not to use the ordinary existing courts of the land. Instead, 1,700 Hereditary Health Courts (*Erbgesundheitsgericht*), and 27 Hereditary Health Supreme Courts were in process of establishment immediately after the law went into effect on January 1, 1934.

Each Hereditary Health Court is to articulate with the District Court in the same area. It shall comprise a district judge as the presiding officer, a medical officer, and one additional person whose qualifications are that he shall be a national licentiate physician of proved competence in hereditary health learning. For these three members of the court, alternates are to be appointed to serve when necessary. The law states that the supreme authorities of the land are to designate the court members, the alternates, the places, and the districts of both lower and higher courts.

A second safeguard in the law is that all applications must be in writing. Facts supporting the application are to be substantiated through medical opinion or otherwise. The court office is obligated to notify the medical officer of the application.

A third safeguard is that jurisdiction for the making of a decision lies with the Hereditary Health Court in the district in which the person to be made unfruitful has legal residence.

Fourth, no judge can serve as presiding officer in one of these special courts in a case where he has rendered a decision appointing guardianship, nor can a medical officer who has sponsored an application function in his other capacity as a member of the Hereditary Health Court in the same case.

Fifth, the proceedings of a Hereditary

Health Court are not public. Such a course would be a sad blow to a certain stratum of American newspaperdom.

Sixth, the Hereditary Health Court is obligated to institute necessary investigations, call and interrogate witnesses and experts. Physicians who serve as witnesses or experts are obliged by the court to divulge information without observing professional secrecy. Judicial and governmental officials are similarly compelled to give all necessary information as the court may request.

Seventh, after an unhampered decision, the verdict of the court must be signed by those who participated in the decision regardless of whether this was for or against a given application. The written decision must include the reasons on the basis of which sterilization was approved or disapproved. This decision is then transmitted to the medical officer, to the person whose sterilization was up for decision, or to this person's legal representative.

Eighth, if the court decision is in the affirmative, it remains inoperative for 1 month. During this period the same persons entitled to file an application are likewise allowed to file an objection. Thereupon the case is reviewed by the Hereditary Health Supreme Court. If no complaint is filed against the decision of the lower court in the allotted time, the decision is automatically subject to execution. The decisions of the Hereditary Health Supreme Court are final.

The Hereditary Health Supreme Court is organized on the same basis as the lower court. It articulates with the Supreme Court in that area. Its composition is a supreme court judge, a medical officer, and a physician who is qualified in hereditary health.

A ninth safeguard is that the authorized sterilization operation shall be performed only in a hospital by a national medical licentiate. The supreme state government designates the hospitals and physicians eligible for

executing court decisions. But the operation may not be performed by any physician who has participated in the court procedures in a given case. The operating physician must send a written report to the medical officer certifying that he performed the sterilization and also by what method.

Tenth, persons participating in any capacity in the proceedings of the court are obligated to maintain secrecy. Failure to do so makes the talkative person subject to an imprisonment up to 1 year, or to a money fine.

Once sterilization has been refused court authorization, reconsideration is permissible only upon the receipt of new facts.

Sterilizations not carried out in accordance with this law, as well as castration, are permissible only when a physician acts in accordance with the known rules of medical science to avert a serious danger to life or health of the patient, whose full consent must be obtained before the operation is performed.

Once the court renders a final decision ordering sterilization, it is to be performed even against the wishes of the person most concerned, and even with the help of the police authorities to whom the medical officer may apply to take the necessary steps. When other measures fail, the employment of force is permissible.

The expenses of court proceedings are to be met with state funds. The surgical operations and hospital care are to be paid by sickness insurance funds where the patient is a member, or by public welfare funds where the patient is not a member of the sickness insurance funds and is needy. In carrying out court decisions, medical and hospital fees are to be prescribed. Only the minimum schedule of expenses may be paid from state funds. Where the patient or his family require more service than this minimum affords, they must pay the difference.

This law was signed by the German Chancellor, Adolf Hitler, by the Minister of the Interior within whose jurisdiction fall matters of public health and medicine, and by the Minister of Justice. All of the important features of this law are included in this presentation.*

There is a separate law regarding the sterilization of chronic criminals which has plenty of teeth in it. To avoid confusion and achieve reasonable length to this paper, no further mention will be made of it at this time. Here we have to do primarily with hereditary diseases and their prevention as outlined in this German program. For this same reason other laws on fostering marriages and children through financial aid, land inheritance laws, civil service and racial discriminatory laws will be omitted here.

During my 6 months in Germany, in which I traveled over 10,000 kilometers in every major section of the country, it was my privilege to meet some of the leaders in the present political regime who are responsible for new undertakings in reconstruction of the social order. I did not always agree with their points of view. But they conceded this to be my privilege. Public health practices are fairly well stabilized in this country to suit German conditions and, apart from changes in personnel and in budget, are not being seriously disturbed. The one most interesting new thing is the government's racial hygiene program of which this sterilization program is but a part.

To a foreigner there are many reasons to explain why, suddenly, this government has launched such a sterilization program. A viewpoint prevails that Germans must live with themselves within their own borders for the

* Two copies of the original promulgation by the government are on file in the office of the American Public Health Association for any who wish to make an exact and personal study.

immediate future, and depend more than ever upon their own resources. These resources are much depleted. Hence the present load of socially irresponsibles are liabilities which represent a great deal of waste.

The people have acquired a state of mind accustomed to change. So many bewildering changes of one kind or another have already been introduced during the past year that another innovation does not stand out in sharp relief. Already on their way toward changes it is not such a far jump to a philosophy of life which says in effect that human breeding is not an innate right to be exercised by all adults possessing the necessary anatomical parts, but instead, a privilege to benefit the individual, the family, the community, and the state. The state has not determined who shall breed, but in this and other laws it has most definitely stated who shall not become parents, and why.

To explain the economic reasons back of this program it is not enough to say that Germany's load from the outside is the cause—reparations, government and private post-war debts, loss of colonies, and the decline of the foreign trade; nor alone to internal loads such as the long pull toward recovery from the 1923 inflation, unemployment, war and old age pensions. These are loads which other nations are carrying also.

There are other factors which point more directly to the necessity of a sterilization program. The census of June 16, 1933, showed a total population of 66,165,879.² Of this number 738,334 are handicapped as follows³:

Physically crippled	429,654
Mentally deficient	230,112
Deaf and dumb	45,376
Blind	33,192

Another category comprising 167,854 persons lists those requiring institutional care⁴:

Insane and epileptics—

302 asylums with 141,910 beds

Feeble-minded— 92 asylums with 24,519 beds

Chronic alcohol

and narcotic

addicts— 33 asylums with 1,425 beds

On March 31, 1932, there were 3,854,520 persons receiving public funds. Of this number there were only 40,614 war cripples listed, and 216,199 unemployed. These few quotations from the *Statistical Yearbook of Germany for 1933* give some indication of the weight of the internal load the German social order is required to carry.

Under these circumstances it is no wonder that the German government is trying to discover ways to lighten the load. To one who lives here for some time, such a sterilization program is a logical thing.

On the one hand the government is bending every effort to organize the 1,700 lower and 27 upper Hereditary Health Courts. On the other, it engages in widespread, varied, concentrated propaganda. Under the direction of the German Medical Society, 17 special films are in preparation. Other films have already been prepared and shown. Special magazines dealing with the entire race hygiene problem have been founded with government aid. There have been a number of special conferences called by the government for physicians. At the one I attended 498 physicians paid 5 marks each for registration fees for the 3-day session. We sat from 9 in the morning till 1 or after in the afternoon, and then after lunch were taken to visit hospitals and asylums where cases were presented and discussed. At another medical congress of the same kind the course lasted for 7 days, cost 25 marks registration fee, and so many physicians enrolled that the list had to be closed. Such training schools are being operated all over the country with great success except in the strongly Catholic areas.

An example of government sponsored newspaper propaganda is the following account which was sent out from Berlin and appeared in different parts of the country⁵:

On January 1, the law to prevent hereditary sick progeny comes into force. In the entire country by January 1, there will be established 1,700 Hereditary Health Courts and 27 hereditary health courts.

Scientific investigations have been under way to determine the number of those who within a short period of time must undergo sterilization. These estimate the number to be around 400,000, distributed among the 9 diseases which the law defines as hereditary. The larger portion, in fact, one-half, are those suffering from inborn feeble-mindedness. This approximation of 400,000 is about equally divided between males and females.

Also over the costs of making a person unfruitful there is information available. In the course of time these will be lessened very greatly while experience in this direction accumulates. Today one estimates the cost of an operation on a male to be about 20 marks. It is so simple to carry out that the man need stay on his back only 4 days. Calculating on the basis of 200,000 males, the total cost will be about 4,000,000 marks. Somewhat more ceremonious is the operation on a female. She requires at least 8 days in a hospital and an expenditure per head of approximately 50 marks; so that the sterilization of 200,000 females will cost 10,000,000 marks.

These 14,000,000 marks constitute a special burden in the first years. But the investment provides such rich interest as no other capital has ever returned. Professor Lenz has calculated that the very least the hereditary sick are costing annually is 350 million marks. Friedrich Murgdörfer comes to an amount of not more than 1 million marks difference. Measured in these figures the expenditure of 14 million marks is entirely insignificant. After 10, 20, or 30 years it is certain that the yearly expenditures of hundreds of millions of marks for the hereditary sick will decrease markedly. Providing the money will be in the greater part through the carriers of social insurance.

The opposition voiced thus far has centered largely around Catholic church influence. This influence flows through many church organization channels both inside and outside Germany. Open opposition can no longer be voiced by the Catholic party, for this Centrum party in common with all others has been suppressed. Neither the Catholic church nor the German Government is inclined to yield. The only way out may be the adoption of the proposal now under discussion whereby this church as such will assume full and exclusive responsibility for the care of those of its members who come within the purview of this law and should be sterilized. Then comes the question of how far institutionalizing these unsterilized hereditary sick should go to safeguard the communities in which they live. No answer has as yet been found to that question.

Since this law was enacted the customary leaves of absence for inmates under institutional care for the mentally sick have been withdrawn lest undesirable impregnations occur. The law will be applied on a wide scale first in asylums among those ready to be discharged, and among the feeble-minded.

In March when I pass through Germany on my return from the Balkans I shall renew some of my present contacts to secure further information on what Germany's experience has been since the law went into effect.

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5. *Dresdner Neueste Nachrichten*, Dec. 21, 1933, p. 3.

Practical Limitations in the Attempt to Control Enteric Disease by the Examination of Specimens Collected Without Regard to Clinical History or Epidemiological Evidence*

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THE attempt to control enteric diseases through the examination of specimens collected as a routine procedure, without selection, from all food handlers or persons engaged in other occupations in which the carrier condition might render them a menace, seems in the light of our experience to be inadvisable. The findings do not justify either the work or the expense.

A study of specimens of feces and urine from food handlers in a number of state hospitals in 1924 and 1925, after outbreaks of typhoid fever had occurred in two of them, illustrates this point. Cases of typhoid fever had been reported within a period of a year or two in all of the hospitals from which specimens were received, with two exceptions. The findings in the specimens from these two hospitals are of particular interest. From one, 116 specimens were submitted from 53 food handlers, and no carriers of *B. typhosus* or *B. paratyphosus* were found. From the other, 2,053 specimens were sub-

mitted from 813 food handlers. Two carriers of *B. typhosus* and 1 carrier of *B. paratyphosus* B were found. *B. typhosus* was isolated from 1 specimen from another individual, but 14 other specimens from this person were not found to contain *B. typhosus*. If the first specimen was authentic, this particular food handler was probably recovering from an infection which had been unrecognized.

From the two hospitals mentioned, 2,169 specimens from 866 food handlers were examined and 3 carriers were found. Thus, the average number of specimens examined in discovering 1 carrier was 723. Assuming the cost of examining a specimen for *B. typhosus* to be about \$2 when large numbers of specimens are handled, the finding of 1 carrier under the conditions mentioned required the expenditure of about \$1,500.

In the examination of 6,269 specimens from 3,583 food handlers in the institutions where epidemics of typhoid fever were occurring or from which cases of typhoid fever had been reported fairly recently, *B. typhosus* was found in specimens from 47 individuals and *B. paratyphosus* A or B in those from

* Read before the Laboratory Section of the American Public Health Association at the Sixty-second Annual Meeting in Indianapolis, Ind., October 9, 1933.

3 others. In 18 instances, these microorganisms were isolated from only 1 specimen, which would suggest that the individuals from whom they were submitted may have been recovering from an infection. Thus, even when cases of typhoid fever are occurring in institutions, the examination of large numbers of specimens is required in order to discover the typhoid carriers among the food handlers, if epidemiological and other factors are not considered.

A false sense of security may result from the examination of a specimen or two submitted from each food handler, since every carrier of *B. typhosus* would not be discovered by this procedure. Even when a number of plates are used in the study and a most careful search is made, *B. typhosus* may be found in only a relatively small percentage of the fecal specimens obtained from some typhoid carriers.

The study of environmental factors, careful history-taking, and the submission of a series of specimens of feces and urine, or preferably a specimen of duodenal contents from food handlers who have had enteric disease, colitis, cholecystitis, etc., or whose immediate associates have had typhoid or paratyphoid fever, would probably result in the detection of most carriers of typhoid or paratyphoid bacilli among them. Of course, there are exceptions. When cases of enteric disease have occurred among patrons of a restaurant or on a milk route, series of specimens from all the food handlers concerned

should be examined if the carrier is not found among those with suggestive histories.

Despite the fact that unrecognized cases occur, probably one of the best means of approaching the problem is by studying specimens from patients who are convalescing from typhoid fever or allied infections, in order to detect the ones who will become carriers. Since the submission of specimens from persons who have recovered from typhoid fever has been required by the New York State Sanitary Code, no cases of the disease, as far as the authors are aware, have been traced to an individual who has been released after fulfillment of the requirements.

In order to avoid the fruitless expenditure of time and materials in the examination of large numbers of specimens that have been collected without discrimination from various groups of individuals, the relative futility and excessive cost of such work should be explained to members of county medical societies and health officials. The same amount of money would yield vastly greater returns if expended in the pasteurization of products wherever possible, the improvement of sanitary facilities, the provision of training in personal hygiene, the removal from work and the treatment of food handlers who are obviously ill, the careful study of epidemiological factors, and the examination of series of specimens from individuals whose history or clinical manifestations warrant it.

Protein, Minerals and Vitamins of Evaporated Milk

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IN July, 1929, there appeared in this JOURNAL one of the first discussions of the nutritive value of evaporated milk.¹ Since that date, many of the statements about this food, which were then based on a limited number of researches, have been verified by a large group of experiments, both laboratory and clinical. Per capita consumption of evaporated milk has increased from 11.3 lb. to 12.5 lb. The national demand has grown by 189,600,000 lb. to an annual use of more than 1,560,000,000 lb.

If this rapid advance in consumer acceptance seems striking, so to a greater extent is the change in professional opinion in the last decade. In 1923, one of the government agencies warned that "evaporated milk may be used in emergencies for a short time only." In July, 1933, the Department of Agriculture said, "Evaporated milk is as valuable as fresh milk for food preparation."²

Notwithstanding the plenitude of such unequivocal comment, however, and although evaporated milk is considered a staple article of diet by millions of people, "certain persons cling to the belief that it will not be many years before investigators will discover it to be harmful. Many doctors are prejudiced against its use, while dietitians have been known to criticise adversely projects in low cost diets because it was used exclusively."³ And, it might be added, even though the U.

S. Public Health Service has declared that "children fed pasteurized, or other heated milk, thrive as well as children fed raw milk, and contract certain communicable diseases less frequently."⁴ It is believed that the objections to evaporated milk still heard are conscientious and sincere, and are to some extent due to recency of much of our knowledge of the nutritional value of this food.

The early work of Marriott⁵ and Brennemann⁶ on evaporated milk in infant feeding formulae is widely known; but these workers, from the nature of their problem, stressed the protein characteristics more than mineral and vitamin content. Their papers were submitted before the conclusive findings of the latter were known. They are comparatively new, and have not had as yet an extensive circulation.

The general need has been for a review of *all* the known facts concerning the nutritive value of evaporated milk, in relation to each other. A résumé of that character is the purpose here.

PROTEIN

In March, 1929, Marriott and Schoenthal⁵ stated that

. . . the heating of the milk (during sterilization) brings about certain changes in its chemical, physico-chemical and physical properties. The casein undergoes alteration so that when subsequently subjected to coagulation by rennin or acid, a curd is formed which has much finer texture than that from raw milk. . . . There are good reasons for supposing that a fine curd from milk used

for infant feeding is desirable. . . . The known qualities of evaporated milk—its sterility, its ready digestibility and uniformity of composition—are distinct advantages which recommend it for general use as milk for infants.

The ensuing years brought concurring opinions from Brennemann,⁶ Nicholson,⁷ Kerley,⁸ Reiss,⁹ Dennett and Craig,¹⁰ Sauer,¹¹ Kositzka,¹² and numerous others. Altogether since 1929, 2,700 infants have been studied in evaporated milk experiments.¹³ Kositzka states:

From our own observations on weight increases, we conclude that in the early months of the infant's life, unsweetened evaporated milk has certain advantages in infant feeding. . . . From the standpoint of economy, availability, sterility, uniformity of composition, and easy digestibility, unsweetened evaporated milk has decided advantages over bottled cow's milk in infant feeding.

Nicholson and Reiss both reported the successful use of lemon juice as an acidifier and antiscorbutic agent in the preparation of evaporated milk formulae. Hill¹⁴ has recently stated that the digestibility of cow's milk is inversely proportional to the curd tension. The curd tension of evaporated milk is 3 grams, as compared with a considerably higher value for raw milk.^{10, 14} The White House Conference on Child Health and Protection declared: "It (evaporated milk) is an economical food and on account of its many advantages bids fair to be one of the most extensively used infant foods of today."²³

MINERALS .

The calcium, phosphorus, and nitrogen availability (findings on the latter element tying into the foregoing discussion) have been determined by Willard and Blunt,¹⁵ Kramer, Latzke and Shaw,¹⁶ and Jeans and Stearns.¹⁷ The first two groups of researchers studied both children and adults, concluding that evaporated milk, on a comparative basis with other forms of cow's milk, can be given a very high

rating in the ease of utilization of those elements. The last named experimenters, following an observation of 9 male infants, reported that

. . . dentition was early, the infants averaging 6 teeth erupted at 40 weeks. The physical development, as indicated by sitting and other performance, was very good. . . . The growth in length and weight was excellent and exceeded standard rates of growth and the rate of the average male infant of Iowa . . . the retentions of nitrogen, calcium, and phosphorus were high . . . early carpal ossification, rapid growth in body length, and the absence of clinical or chemical evidence of rickets are considered evidences of good bone growth.

To round out the mineral picture, Lewis and Stein¹⁸ have shown that "the feeding of evaporated milk to normal rats produces a fall in hemoglobin without the corresponding drop in the erythrocyte count that occurs when raw milk is the sole article of diet." This phenomenon they attribute to the presence in evaporated milk of a trace of copper, which retards the development of nutritional anemia caused by the low iron content of milk.

VITAMINS

On vitamins A and D in evaporated milk, we may examine the unpublished findings of Farmer and Lemkau. Both vitamins, these workers found, are present in evaporated milk to the same extent as in the original milk, unaffected by evaporation, homogenization, sterilization, or storage. Barnes,¹⁹ who observed a group of infants, reached the identical conclusion concerning vitamin D.

Koch and Samuels,²⁰ and Todhunter,²¹ found vitamin G present to the same extent as in the original milk. Koch and Samuels reported a loss of about one-fifth to one-sixth of vitamin B in the evaporation process. As milk is not an important source of vitamin B, and since other foods containing it should be given, this loss is not significant. The same holds true with

reference to vitamin C. While heating no doubt eliminates a large part of it, milk, even in its original state, has never been considered, quantitatively, a good source of this vitamin. In fact, no infant or child is well fed without the addition of an antiscorbutic.

It is a correct assertion that in the vitamins of which milk is a good source, associated with growth, protection against respiratory infection, and pellagra, evaporated milk is completely dependable.

STERILITY

Deming and Davis²² undertook a bacteriological study to determine whether evaporated milk was sufficiently free from viable microorganisms to be, from the bacteriological standpoint, a safe food for infants. For the investigation these workers purchased 154 "tall" cans from the open market. From each tin of milk both anaerobic and aerobic cultures were prepared. After observing such cultures from 102 of the cans at 37° C. and from 104 of the cans at 55° C., they concluded that

... evaporated milk is not only free from pathogenic microorganisms, but may, for all practical purposes, be considered sterile.

USE IN SPECIAL CONDITIONS

Marriott and Schoenthal⁵ early stated that

... evaporated milk was especially suitable for premature infants; and, when suitably modified, was a satisfactory food for sick infants, especially those suffering from nutritional or gastrointestinal disturbances.

Their experience has been borne out by others. Poole and Cooley²⁴ indicate that prematures over 1,400 grams in weight

... thrive well when a diluted, unsweetened, evaporated milk formula, with added carbohydrate, is gradually and carefully substituted for modified breast milk. Non-acidified evaporated milk has been found satisfactory for the larger prematures and during the period of after-care in the homes.

These two workers also used evaporated milk successfully in diarrhea cases,²⁵ reporting that

... when diluted to one-half or two-thirds strength, with protein or carbohydrate additions, it proved to be a satisfactory formula for most of our patients as soon as they were able to take milk ... the evaporated milk formulae can be readily adjusted in percentage, acidity, and consistency to meet these special requirements.

Cutler²⁶ has demonstrated that the denaturing of the whey proteins lactalbumin and lactoglobulin, in the course of the sterilization of evaporated milk, render it tolerable to milk-sensitive persons. West²⁷ has said, in regard to the feeding of the marasmic baby:

A very digestible high caloric type of feeding is essential. The marasmic infant is usually intolerant to fats and sugars, and for this reason does not do well on the ordinary raw or cooked cow's milk dilutions with soluble carbohydrate additions. The easily digested unsweetened evaporated milk with additions of calcium caseinate and starch has been found to fulfil satisfactorily these requirements.

That the celiac patient can assimilate the homogenized fat of evaporated milk, was recently shown by C. V. Rice.²⁸ Unpublished work, soon to appear, indicates that from the standpoint of acidity and gastric motility, evaporated milk is useful in the treatment of duodenal and peptic ulcer, and other gastrointestinal disturbances.

FROZEN MILK

It is a curious fact that although millions of gallons of ice cream are consumed annually, and nutrition specialists recommend it as an excellent way of securing part of the daily milk quota, there are people who believe that the freezing of milk renders it dangerous to health. Palmer³³ has shown, in an experiment on albino and piebald rats, that

... standard vanilla ice cream is a valuable supplement to certain types of diet for

growth. In addition, the same ice cream alone is capable of promoting growth at a moderate rate to produce mature animals of normal or nearly normal size and weight. . . . None of the animals fed the basal no ice cream diet attained the weight of the poorest animal fed this diet mixed with one-third by weight of ice cream, although the mean consumption of total nutrients was the same. Likewise, only one animal in the basal group attained the weight of the poorest animal fed ice cream alone. . . .

Louder and Smith²⁹ fed normal evaporated milk to one group of albino rats, and frozen-thawed evaporated milk to another group. All the rats were in good physical condition at the end of the experiment, and the researchers concluded that "none of the food value of evaporated milk is destroyed by freezing, and neither is there produced any substance deleterious to health." Dr. Helen Mitchell successfully used evaporated milk that had been frozen, during a nutrition experiment in Labrador.

FLAVOR

The sweet taste of evaporated milk (which is actually an assurance of proper sterilization, and therefore safety) is something some people still find a new experience in food. Those familiar with the flavor of raw milk find it necessary to make an adjustment to the taste of pasteurized. Hollinger and Roberts³⁰ undertook to determine "the extent to which evaporated milk would be generally accepted as a beverage without any preliminary period of becoming accustomed to it . . ."

They discovered that,

. . . out of 921 individuals to whom diluted evaporated milk was served, 548, or 60 per cent, would apparently accept it without any preliminary period of learning to like it. The percentage of acceptance is greatest with younger children. . . . The ease with which the adults in this study changed their attitudes toward evaporated milk, however, indicates that prejudices can be overcome at any age provided the individual really desires to do so.

Of interest in connection with the Hollinger and Roberts work, is the report of hot school lunches prepared under the supervision of 57 teachers in 30 rural schools.³¹ These lunches, in which evaporated milk was the principal ingredient, resulted in significant gains for underweight children, a decrease in absences, better morale, and improvement in the cold lunches brought from home. A positive liking developed for the flavor of evaporated milk.

REASONABLE COST

Two other factors of importance in the school lunch program just described, were the reasonable cost of the milk supply, and its convenient keeping qualities in the sealed tin, under conditions where refrigeration was impossible. Those are the factors which have made evaporated milk of utmost need in the welfare activities now being carried on to such an enormous extent throughout the country.

The goal of optimum nutrition has not been brought nearer of attainment by this situation described by the U. S. Children's Bureau³²:

One-fifth of the children in the United States have suffered definite injury to health during the depression. . . . Malnutrition in New York City jumped from 16 per cent in 1930 to 21 per cent in 1932, among 300,000 children examined annually since 1927.

If further and more serious depredations on the national physical well-being are to be prevented, careful attention must be given to providing those on relief with an adequate milk intake. That is a principle all nutritionists are urging welfare agencies to follow. In putting it into execution they are finding that the reasonable cost of evaporated milk is a definite aid. Mixed with an equal amount of water, evaporated milk provides a whole milk for every milk use. The dairy industry has learned "how to evaporate milk

efficiently and economically,"¹ how to transport it in sealed tins without refrigeration, and how to deliver it to the consumer sans the more expensive requirements of other methods of distribution.

SUMMARY

1. A brief review has been submitted of the research on the nutritive value of evaporated milk, together with mention of the findings on its sterility, use in special conditions, food value after freezing, flavor, and cost.

2. Many workers have shown evaporated milk to be a successful food for infants, attributing this experience in large part to the soft, easily digested curd precipitated in the stomach.

3. Studies with both children and adults have demonstrated that the calcium, phosphorus, and nitrogen of evaporated milk are readily available. Evaporated milk supplies the same amounts of these elements as do other whole milks.

4. It has been established that evaporated milk supplies qualitatively and quantitatively the vitamins milk is depended upon to supply.

5. A bacteriological investigation of evaporated milk has shown it to be sterile in the sealed tin.

6. Considerable success has attended the use of evaporated milk in cases of premature birth, diarrhea, allergy, marasmus, celiac disease, and gastrointestinal disturbance.

7. It has been proved that the freezing of evaporated milk does not impair its food value, and does not produce any substance deleterious to health.

8. A study of a large group of individuals has shown that children readily accept and like the flavor of evaporated milk. Adults also quickly become accustomed to it.

9. The reasonable cost of evaporated milk is of distinct service in assuring an adequate milk intake to families affected by the economic emergency.

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Need for Methods for the Bacteriological Examination of Crustacea^{*}

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IN recent years the commercial production of cooked crustacea meats, packed in unsealed containers and shipped under refrigeration ready for consumption, has attained an important place among the seafoods industries. While statistics are not available to show over a period of years the actual production of fresh crabmeat handled and shipped as a perishable commodity, it is estimated from the known catch of hard crabs that the approximate pack in the Chesapeake Bay region alone increased from 2,000,000 lb. in 1925 to 5,200,000 lb. in 1931.¹ In that year the production of fresh crabmeat in the United States amounting to 6,779,990 lb., represented about 75 per cent of the total production of all crustacea meats sold in packages as "fresh-cooked."

Fresh crabmeat is produced commercially in 10 states on the Atlantic and Gulf Coasts and in the 3 Pacific Coast states, and in Alaska. It has become a well known article of diet and is in demand for salads, cocktails, soups, and certain cooked dishes. In addition to crabmeat other crustacea meats are produced commercially and

are shipped in cooked condition ready for consumption. In the United States and Alaska in 1931 there were produced in a fresh-cooked condition 124,052 lb. of lobster meat, 1,671,455 lb. of cooked and peeled shrimp, and an appreciable, but unknown, quantity of crayfish, or spiny lobster meat,² making a grand total of all cooked crustacea meats, including crabmeat, of nearly 9 million lb. This is no insignificant item in the American dietary.

In order to understand why there is any particular need for the development of bacteriological methods for the examination of these products it is only necessary to consider the methods of production, the opportunities for contamination, and the perishable character of the products. In preparing this type of food for the market the crustacea are cooked in retorts or open kettles. Then, after cooling and trimming, the meat is picked out by hand. Grading is based on the part of the body from which the meat is taken, and according to size of the lumps or flakes. After picking and before packing the meat may or may not be washed. The product is then weighed into cans and with no further heat treatment is packed in larger containers with crushed ice for shipment.

Special investigations with crabmeat

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have shown that the meat within the shell of the crab after cooking is sterile or nearly so. From the cooker on to the final container the product is subjected to multiple sources of contamination. Cooling of the crabs, lobsters, or crayfish, may be conducted under conditions which grossly contaminate the exterior of the shells. During picking this contamination may be transferred to the meat. Pickers too frequently are not scrupulously clean in their habits. Pans, knives, work benches, and utensils with which the meats come in contact may not be maintained in clean condition. The products also come in contact with water and ice, frequently of unknown sanitary quality. In some sections where crustacea meats are produced in quantity, toilet facilities and methods of waste disposal are primitive and crude. In some establishments it has been observed that adequate provision is not made to protect the meat from contamination with material from filthy and dangerous sources. Unless constant warfare is waged to prevent it, contamination may occur from flies, rats, and mice. Crab, lobster, and crayfish meats are handled extensively from the time of cooking until the product reaches the consumer, and there is ever present the opportunity for contamination with filth and with pathogenic bacteria. It is not the intention to imply that all crustacea meats, as produced commercially, are unclean or potentially dangerous. It is regrettable that observations in some communities have too often disclosed objectionable conditions and faulty methods, but in such instances vigorous action has been taken to bring about the desired reformation. With the proper sanitary control it is possible and practicable to produce crustacea meats free from objectionable bacteria. Following re-

cent reforms in sanitary procedures we have reason to believe that crustacea meats as now produced commercially are clean and wholesome. There is, however, need for constant bacteriological control.

It is not unreasonable to compare crustacea meats with oysters or clams that are eaten raw. In fact, the comparison might be extended to include milk. All these products offer conditions conducive to the growth of bacteria. All are handled extensively during production and are subject to contamination with pathogenic organisms, and, to some extent they are all consumed in the condition as produced without further cooking. It has been recognized for a long time that in the interest of public health and consumer protection, control of oyster, clam, and milk production involving bacteriological examination has been necessary. Standard methods for the bacteriological examination of milk and oysters have been in existence for a number of years. There is also a need for the development of a bacteriological method to ascertain whether or not fresh-cooked crustacea meats have been produced under sanitary conditions and are fit for consumption.

In its regulatory work in connection with the enforcement of the Federal Food and Drugs Act, the Food and Drug Administration in recent years has accepted the presence of fecal *B. coli* in cooked crabmeat and other cooked crustacea as evidence of filth and potential danger to health. Certain experimental work and extensive experience with these products have demonstrated a correlation between insanitary methods of production and the incidence of fecal *B. coli* in the finished product.

Institution of regulatory control of commerce in crustacea meats was begun

in an attempt to prevent the recurrence of food poisoning cases which had from time to time been reported as due to crabmeat, and to prohibit the distribution of unclean products. There were no methods for bacteriological examination of these products described in the literature. The need for such methods called for an adaptation to crustacea meat of recognized procedures for the detection of *B. coli* in other products. For some time there has been employed in the Food and Drug Administration a method of crustacea meat examination which has been satisfactory. A known amount of meat is weighed aseptically in a wide-mouth sterile bottle. To the meat is added a known amount of sterile water or salt solution, and the mixture is shaken vigorously with sterile glass beads. The resulting suspension then consists of washings of the meat containing the bacteria present on the product. Standard lactose broth is inoculated with decimal dilutions of this suspension and incubated at 37° C. Where positive presumptive tests are obtained the lactose broth cultures are streaked on plates poured with Levine's eosin-methylene blue agar. From the eosin-methylene blue agar plates typical fecal *B. coli* colonies, when present, are transferred to agar slant cultures and are later further identified and classified as to their position in the colon-aerogenes group.

This method has worked satisfactorily in the hands of the various analysts of the Food and Drug Administration in the examination of nearly 3,000 individual packages of fresh-cooked crustacea meats. The results obtained have in general correlated with the known sanitary conditions under which the meats were produced. Since the technic and media already mentioned have been found reasonably satisfactory, we have not attempted to substitute other meth-

ods or other media which are sometimes used for the detection of *B. coli* in foodstuffs. It is possible that the substitution for standard lactose broth of some other medium might result in a higher percentage of confirmations of fecal *B. coli*. Also some medium might be selected that would restrict the growth of those bacteria which interfere with the growth of colon organisms. Any of several direct plating methods using a differential medium for distinguishing members of the colon-aerogenes group might be applied to expedite the analysis. It is necessary that any method adopted must be productive of prompt results in showing whether or not fecal *B. coli* are present in crustacea meat suspected of being polluted. The product is produced, shipped, and consumed in a short period of time, and any method applicable for control purposes must be reasonably rapid. Whether the adoption of some method different from that outlined here will further expedite the work and produce equally reliable results is a subject for investigation.

It has been stated that the presence of fecal *B. coli* in crustacea meat has been accepted by the Food and Drug Administration as evidence of filth and potential danger to health. In interpreting the results of bacteriological examination of these products it has not been the practice to attach the same significance to non-fecal and intermediate strains of colon-aerogenes organisms. Just what interpretation is to be placed on the presence of members of the colon-aerogenes group not proven to be fecal in origin is an open question. The presence of such organisms may have more significance in these products, which are sterile as they start on their way through the picking house, than they would have in certain raw products. For the time

being, however, we can assume that colon-aerogenes organisms not strictly fecal in character do not indicate potential danger to health in the use of the product, although their presence may represent an undesirable contamination signifying an unclean condition. We do know that in properly conducted establishments crustacea meats can be, and are being, produced entirely free from *B. coli*. It would seem then that the presence of any fecal *B. coli* in fresh-cooked crustacea meat would constitute evidence of improper handling and filth. Standards and tolerances are always controversial topics. We are making no definite recommendation now, but if standard bacteriological methods are to be developed, some thought must be given to the question of permissible numbers of colon-aerogenes organisms, if any at all are to be permitted, in products of this kind.

In the control exerted over crustacea meat products, it has not been the practice to place a great deal of emphasis on total counts of bacteria. Nevertheless, the total counts of aerobic organisms do have a very definite significance. All the viable bacteria on the finished product are the result of contamination picked up in the preparation of the meat for shipment. Consequently, the total numbers of bacteria present are a direct index of the degree of cleanliness and expedition exercised in handling the product. It has been the procedure to plate dilutions of the suspension obtained as heretofore described using standard nutrient agar with incubation at 37° C. Better media and more appropriate incubation temperatures might be devised for these products. Any standard method developed should not overlook the significance of total counts in ascer-

taining the fitness or unfitness of crustacea meats for food purposes.

With the growth of the industry producing fresh-cooked crustacea meats various control agencies, both official and nonofficial, have a common interest in helping to produce a clean, sound, and wholesome food. Each of these agencies can, of course, develop a method of examination satisfactory to themselves, and can establish their own standards and tolerances. Such a development of diverse methods and standards of judgment would result only in confusion for the producer, and for those control agencies organized for the protection of public health and human welfare. A uniform procedure and a common basis of judgment are needed.

A statement then as to the need for methods for the bacteriological examination of crustacea can be summarized in a few brief sentences. There is an increasing production and a wide distribution of crustacea meats sold in cooked condition ready for consumption. These products are subject to contamination throughout their preparation, distribution, and sale. The nature of the contamination is such that it carries with it potential danger to the health of the consumer. The technical control of preparation and the legal control of production, distribution, and sale involve bacteriological analyses. For the accomplishment of the greatest good there should be one method of analysis acceptable to and used in common by all agencies having a part in the sanitary control of these products.

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Suggested Laboratory Procedures for Use in Determining the Cause of Food Poisoning*

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ANY consideration of procedures for determining the cause of food poisoning outbreaks must first take account of the various etiological agents concerned in these cases of illness. The term "food poisoning" is a very broad one and the illnesses included under it are caused by a variety of factors. Certain bacteria play a prominent rôle. A number of metallic compounds may produce poisoning. A few foods are inherently poisonous due to the presence of alkaloids or more obscure but perhaps related substances. The phenomenon of food allergy is occasionally encountered. Finally, there are always a number of outbreaks in which no definite causative agent can be ascertained. At times the epidemiological evidence and clinical symptoms may afford a clue to the nature of the causative agent, but at other times this information is of little assistance.

No attempt will be made to deal with chemical procedures since that problem should be referred to those especially qualified. Our chief concern here is the bacteriological examination.

When the bacteriological laboratory is asked to make an examination of suspected food we must have clearly

in mind the microorganisms which experience has shown capable of causing food poisonings. At present 3 groups have been definitely implicated, with suspicion directed toward several others. The groups for which definite evidence has been repeatedly obtained are: (1) *Clostridium botulinum*, (2) certain members of the *Salmonella* or paratyphoid group and (3) *Staphylococci*. There have been a few instances in which members of the dysentery group and streptococci appeared to be responsible and a causative rôle has been claimed for *Proteus*.

Our chief concern must be the detection of those types which have been encountered most frequently, though we should not overlook the possibility of finding some other organism which may be significant. The possibilities fall into many different bacterial groups and the organisms concerned present quite different characteristics. It seems worth while to attempt to formulate a procedure which should be effective in detecting any of them, if present, and which should not be so unduly complicated that it could not be applied by the average laboratory.

The following outline is presented, not as a standard method, but rather as a suggested procedure which it may be desirable to modify. Such an out-

* Read at the Joint Session of the Laboratory and the Food and Nutrition Sections of the American Public Health Association at the Sixty-second Annual Meeting in Indianapolis, Ind., October 10, 1933.

line may have some merit if it assists those unfamiliar with this problem in the examination of suspected foodstuffs which they may be suddenly called upon to make.

LABORATORY PROCEDURE

A. First Examination—

1. Prepare a stained smear (Gram stain) directly from the foodstuff, preferably the liquid portion.

2. With a loopful of the foodstuff * streak in succession 2 agar plates, preferably a meat infusion agar. With another loopful streak 2 more plates of either Endo or eosin-methylene blue agar. Incubate for 18 to 24 hours at 37° C.

3. Inoculate a tube of broth, preferably prepared from meat infusion, with a small amount of the sample. Incubate at 37° C.

If the poisoning is suspected or definitely known to be botulism the following steps should be included:

4. Inoculate each of 3 tubes of ground meat or beef heart medium with approximately a gram or 1 c.c. of the sample. Ground lean beef, beef heart or veal is tubed with the infusion from the meat so that the layer of ground meat occupies about half of the column of the liquid. The final pH should be 7.2 to 7.6.

Immediately after inoculation 2 of the 3 tubes should be heated to 80° C. for 20 minutes to destroy vegetative cells. If an anaerobic jar is not available the 3 tubes should be layered with about 1 c.c. of sterile vaseline to form a seal. Incubation should be at 35° to 37° C.

5. A portion of the sample should also be used to test for the presence of toxin. Inject subcutaneously at least

2 guinea pigs or 2 white mice with a portion of the food. In most cases it will be necessary to centrifuge the sample before injection to get rid of gross contamination. Use 0.5 to 1.0 c.c. of the supernatant fluid for injection. Where abundant toxin formation is suspected and a sufficiently large sample is available, it is desirable to feed portions to 2 guinea pigs.

Should death of any of the animals occur, controls with antitoxin of types A and B should be included. Inject subcutaneously 2 more animals with a protective dose of type A antitoxin (usually 1 c.c. is sufficient) and an additional 2 with type B antitoxin. These 4 animals should then be injected with the foodstuff in the same way as the original 2 which did not receive antitoxin. If the antitoxic sera are not at hand, these controls should be performed as soon as they are available.

B. Subsequent Examinations—

1. Microscopic examination of the stained smear will give an idea of the relative abundance of bacteria in the product and of the morphological types present.

2. Examine the Endo or eosin-methylene blue plates for the presence of colonies resembling those of the paratyphoid, typhoid, or dysentery groups. If suspicious looking colonies are found, fish several to either Russell medium or to fermentation tubes of dextrose, lactose, and sucrose broths. If such colonies are not encountered, the plates should be incubated an additional 24 hours and reexamined. The identification of suspected intestinal pathogens requires additional procedure and is described in section C.

Examine also the nutrient agar plates and make Gram stains of several representative colonies. Note especially if staphylococcus or streptococcus col-

* If the only sample submitted is an empty jar or can, the interior should be thoroughly washed out with a few c.c. of sterile salt solution or sterile broth. The washings can then be used for the examination.

onies are present in considerable numbers.

3. The purpose of using a tube of broth is to detect by enrichment and subsequent plating any *Salmonella*, staphylococci, or other types which might have been missed by direct plating. If the steps listed under A2 and B2 have yielded no information of value, streak Endo or eosin-methylene blue plates and nutrient agar plates from this broth culture. The examination of these plates should then proceed as given under item B2.

4 and 5. (If suspected botulism) The condition of the animals which were injected under item A5 will afford preliminary evidence of the presence or absence of botulinum toxin in the food. This should now be supplemented by examination of the meat medium tubes inoculated under item A4.

These tubes should be incubated for at least 3 to 4 days. Note any macroscopic evidence of growth and prepare Gram stains from each tube. Note whether Gram-positive bacilli, with or without subterminal spores, are present. Select one or more tubes for a toxicity test similar to that carried out with the original sample under item A5. The result of this will serve to confirm that

secured with the food sample and at times it may be of great value in affording some additional information. In the event of a positive test the meat medium may be used for further purification and isolation of the culture, if this is desired.

C. Checking of Suspected Salmonella or Other Intestinal Types—

Fermentation results similar to those shown in the accompanying outline immediately raise the question whether the organism may be a member of the *Salmonella* group or one of the dysentery bacilli. Since there are many miscellaneous saprophytes which resemble the intestinal pathogens in these superficial aspects, a somewhat detailed procedure of checking is necessary. When a culture has been selected for further examination a Gram stain should be made to see whether one is dealing with a medium-size, Gram-negative, non-sporulating rod.

Salmonella Group—The members of this group which are most commonly responsible for food poisoning are *S. aertrycke*, *S. enteritidis*, and *S. cholerae-suis*. If specific agglutinating sera for these types are not immediately available, nevertheless some information

<i>Russell's medium</i> (24 hour reading)	<i>Fermentation Tubes</i>			
	<i>dextrose</i>	<i>lactose</i>	<i>sucrose</i>	
acid and gas in butt, alkaline slant	acid and gas	negative *	negative *	Similar to that produced by <i>Salmonella</i> group.
acid in butt	acid	negative	negative (or oc- casionally acid)	Similar to Flexner dysentery.
acid in butt	acid	slow acid	slow acid	Similar to Sonne dysentery.

* Incubation should be continued for at least a week or preferably 2 weeks to rule out delayed fermentation of these sugars. Delayed fermentation of lactose or sucrose is *not* typical of the *Salmonella* group.

can be obtained with sera which are usually at hand. It is suggested that agglutination tests be made with *S. schottmülleri* (paratyphoid B) serum and with *S. enteritidis* serum. While the typical *S. schottmülleri* is rarely if ever associated with food poisoning, nevertheless the *schottmülleri* serum will cause clumping of *S. aertrycke* and, to some extent, *S. cholerae-suis*. *S. enteritidis* serum is commonly quite specific. Thus the immediate application of these two sera should be useful in determining if the organism in question is one of the three *Salmonella* types most commonly associated with food poisoning.

At the same time, it is desirable that certain additional sugar fermentation tests be made, where the sugars are available. All *Salmonella* types ferment, with acid and gas production, maltose, rhamnose, mannitol, and sorbitol. Xylose is fermented by all but *S. paratyphi* (paratyphoid A) and arabinose and trehalose by all the types with the exception of *S. cholerae-suis*.

The results of the agglutination tests, together with the cultural characteristics and fermentation tests, will permit a tentative report of the presence of a member of the *Salmonella* group. The final identification of the culture will involve the application of known specific sera, together with whatever absorption tests may be necessary. The peptone-tartrate medium of Jordan and Harmon¹ will also be helpful in determining the type. Excellent summaries of the characteristics and relationships of members of the *Salmonella* group have been prepared by Jordan² and Savage³ and should be consulted in connection with the identification.

Dysentery Bacilli—While rarely encountered in cases of typical food poisoning, nevertheless a few outbreaks have been attributed to these organisms.

Members of the Flexner and Sonne subgroups appear to be implicated.^{4, 5} Here, too, positive identification can be made only after a detailed study of the physiological and serological characters of the culture in question.

Since the Flexner and Sonne types show very little cross-agglutination, it will be necessary to test the agglutination of the culture with both polyvalent Flexner serum and Sonne serum. In biochemical characteristics, it will be recalled that mannitol is fermented with acid production by both Flexner and Sonne bacilli. The chief point of biochemical differentiation is the slow acid production from lactose and sucrose brought about by the Sonne type but not by the Flexner organisms.

EXAMINATION OF FECES

Samples of excreta are often of value, particularly in those instances where the suspected foodstuff has been consumed or destroyed. If fecal specimens are taken, especial endeavor should be made to procure them during the acute stages of illness. It is believed that no detailed laboratory procedure need be given here, since the examination would follow the usual steps employed for isolation of organisms of the enteric group from feces.

EXAMINATION OF NECROPSY MATERIAL

If such material is available following acute gastrointestinal illness which might have been caused by *Salmonella* or dysentery organisms, cultures can be made from contents of the colon, spleen, and mesenteric lymph nodes. Positive cultures, which are definitely identified as *Salmonella* or dysentery types, may be of value in determining the cause of the illness. Positive cultures are usually not obtained from the blood, but where a definite *Salmonella* type has been isolated from the blood

it is often of value when taken in connection with the other findings.

In cases of botulism, toxin can sometimes be demonstrated in blood or in bowel contents by animal injection along with the use of specific antitoxins. It is necessary to centrifuge or filter bowel contents to get rid of the numerous miscellaneous bacteria which are present.

INTERPRETATION OF RESULTS

Since some outbreaks of food poisoning are due to other than bacteriological causes, perhaps the first duty of the bacteriologist is to realize that his part of the examination may at times prove to be fruitless and that he should not feel obligated to attach blame to any organism which happens to be conspicuous.

The laboratory is often asked for proof that the actual organism obtained is in reality the cause of the trouble. Unfortunately, symptoms of typical acute gastrointestinal illness can rarely, if ever, be reproduced in the ordinary laboratory animals by *feeding*. Results obtained by the *injection* of suspected cultures are open to question and should not be advanced as sole proof of an etiological rôle of the organism in question.

However, if a member of the *Salmonella* group has been isolated from the suspected food, one may rest assured that beyond reasonable doubt he has obtained the causative agent. This conclusion seems justified since these organisms are not ordinarily encountered in foodstuffs and since there is now good evidence that they are a definite cause of food poisoning. In the event that it has been possible to isolate a similar *Salmonella* type from specimens of feces or from necropsy material, additional confirmation is thereby obtained.

In the case of staphylococci one cannot be so sure of his ground. We cannot claim a causative rôle for all staphylococci and the strains associated with food poisoning outbreaks cannot be distinguished from others by any definite criterion.^{6, 7} Moreover, these types may readily gain access to a foodstuff before or during the process of collection and thus a correct interpretation of their presence is much more difficult than in the case of the *Salmonella* group. Feeding tests with the usual laboratory animals will afford no definite information and in routine laboratory work one cannot hope to repeat the feeding tests with human volunteers^{6, 7} that were originally necessary to substantiate the causative rôle of this organism. One can only rely upon the circumstantial evidence afforded by the finding of considerable numbers of staphylococci in the interior of the foodstuff.

In the case of botulism there is fortunately direct evidence in the injection and feeding of animals and the protection afforded by a specific antitoxic serum.

COMMENTS UPON THE GENERAL PROCEDURE

It must be emphasized again that the foregoing procedure is a tentative one which it may be desirable to modify. There will doubtless be considerable difference of opinion as to the different media and methods which should be employed.

The choice of the ground meat medium for detection of *Clostridium botulinum* (item A4 in the outline) will perhaps be disputed. The writer has chosen the meat medium since it is easy to prepare and has given reasonably satisfactory results in his hands. Others may prefer an infusion or a digest broth without the chopped meat.

There is still some difference of opinion as to the most suitable medium for detection of small numbers of botulinus spores. Dubovsky and Meyer⁸ reported that a beef-heart-peptic-digest-liver broth of pH 7.2–7.4 gave the most satisfactory results in their detection of botulinus spores in soil. With this medium toxic cultures were recovered when the sample contained from 10 to 100 spores. If there is time for the preparation of such a medium previous to the arrival of the sample, it might well be substituted for the ground meat medium.

In the injection of animals for demonstration of botulinum toxin, the choice of guinea pigs or white mice need not be specified, since the laboratory must often be guided by what happens to be available at the moment. It will be recalled that white mice are very sensitive to toxin on injection (though not when fed⁹) and thus small amounts of toxin may be detected. On the other hand, mice are quite susceptible to miscellaneous infections and also are injured easily during handling. For

this reason death of the mice must be interpreted with caution and positive conclusions cannot be drawn unless the results are uniform and are controlled with known antitoxic sera.

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Combating Employee Illness

IN an effort to combat common colds—an illness which not only causes discomfort to its employees but also costs the company approximately \$7,800 annually in salaries paid to ill persons—the New York *Daily News* this year is offering its employees free inoculations against this winter scourge.

The medical department of the News Company holds that inoculations against colds, while far from infallible, help appreciably in 50 per cent of the cases.

Personnel records of the company show that last year the newspaper's 2,096 employees suffered 1,114 cases of

various kinds of illness. Of these, more than 20 per cent suffered from colds and related diseases. Of all the employees on the payroll in 1932, 28.6 per cent had colds or related disorders at some time during the year.

That means that nearly 600 persons were inconvenienced through this ailment and the company estimates their total salaries while absent came to \$7,800. This does not take into consideration the loss due to the lowered vitality many suffer when they return to work.—*System and Business Management*, 63, 1, Jan., 1934.

Reaching the Negro Community*

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THE Negro furnishes one-tenth of the population of the United States, and as such his health problems should be important to public health workers. Three-quarters of these 12 million Negroes still live in southern states and the majority of them in rural areas where there are most often inadequate medical facilities for either white or black.

About 1915 there began the migration of Negroes from the rural areas and small towns to industrial centers. The importance of this shift of colored people is shown in the following changes in the 10 cities now having the largest Negro population:

	1910	1930
New York City	91,709	327,706
Chicago, Ill.	44,103	233,903
Philadelphia, Pa.	84,459	219,599
Baltimore, Md.	84,749	142,106
Washington, D. C.	94,446	132,068
New Orleans, La.	89,262	129,632
Detroit, Mich.	5,741	120,066
Birmingham, Ala.	52,505	99,077
Memphis, Tenn.	52,441	96,550
St. Louis, Mo.	43,960	93,580

Such a large and rapid movement, of a group of the population, into new living and working conditions, into crowded, segregated areas of bad housing, left a marked impression on the vital statistics of the people, from which they are now showing signs of recovery.

In the typical industrial city the Ne-

gro quarter is along the railroad, as in New Haven, Conn., or along the banks of some dirty stream as in Akron, Ohio. Again, it is in some abandoned section which is being gradually converted from residence to business, as in South Philadelphia. Occasionally, to be sure, a whole great city area, as on the south side of Chicago, or Harlem in New York City, is occupied by Negroes, but such cases are exceptional. The Hill District of Pittsburgh and the East Side in Cincinnati are rather typical instances of conditions to which Negroes are subject. Bound in, as they are, by natural or social barriers, with little opportunity for expansion, overcrowding is a certain result.

Negroes are for the most part unskilled or semi-skilled, low-paid workers, living in houses two or three generations old, which, in a recent survey, are reported to be on an average of only 16 per cent in good repair. The converted kitchenette apartment, now so prevalent in some Negro neighborhoods, in which a home built for one family, becomes the home of many families, constitutes a physical hazard of first importance, with reference to congestion, sanitary conditions, health and morals. There is lack of sunshine, fresh air, cleanliness, play space and normal recreation. There is nearly always a prevalence of influences which tend to destroy.

This concentration of Negroes in compact, segregated areas has generally had the disadvantage, in most cities,

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of allowing to exist a great disparity of health effort between Negro and white communities. Health departments, always without sufficient funds, or personnel, to do the whole job, have concentrated their efforts in white areas where the best showing could be made before influential people, forgetting the social-educational philosophy of Professor John Dewey which says in effect that what the best and wisest wants for himself, that must the community want for all. Health officers should be interested in finding out what exists in the community for the less fortunate; put that information before the public; and secure action favorable to the elimination of these conditions. It is not popular to spend money on Negro health, and the Negro is quite unable to finance his own needs. This, coupled with racial prejudice, accounts for the generally demoralized condition of health efforts in colored neighborhoods. This applies equally to official and voluntary agencies.

Many hospitals and clinics refuse to treat colored patients and it is only with great difficulty that even tax supported medical facilities are made available for Negroes, especially in the South. This keeps the average Negro from knowing very much about the use of medical facilities for the treatment or prevention of disease. Having no place to send the Negro for medical care it is easily assumed that there is small need to carry on an active and continuous health educational campaign. This very segregation also makes it relatively easy to correct the situation, because it affords an opportunity for concentrated efforts in health work. It becomes apparent that there is a sociological problem as a part of the health picture, and that a program planned for educating colored people must also be planned for white people

to show them that in maintaining their social responsibilities and self-preservation, they must include for the Negro, not merely health education, but participation in medical facilities.

The health officer has an opportunity to do a double duty here. He may not only attack community health conditions, but he may assist in the broader aspects of race relationships. Contemplating such a double program he is likely to hesitate, but he need not, for all the elements of solution, including interracial organizations will be found to assist him.

A little preparation in the psychology of the Negro community will help. The Negro press is a good place to start. It is a large and powerful influence among colored people. There are several national Negro news distributing agencies, one of which has over 100 correspondent Negro newspapers. Interested health officers may gain enough of this preliminary information from either the local Negro press, to be found in almost every community, or by subscribing for one of the Negro weekly newspapers with a national circulation, such as *The Chicago Defender*, *The Pittsburgh Courier*, *The New York Amsterdam News*, *The Baltimore Afro American*, *The Norfolk Journal and Guide*, or others. *The Crisis* is the monthly organ of The National Association for the Advancement of Colored People. *Opportunity* is a similar monthly publication of The National Urban League. Both of these are published in New York City. All of these publications will reflect Negro opinion.

It may be necessary to write letters, or publish articles. If the word "Negro" is to be used, spell it with a capital N. Negro is a proper noun, and as such should be capitalized as much as Caucasian, Nordic, Asiatic, Indian, or the names of other races.

Negroes have waged an unceasing, and generally successful campaign, with the leading newspapers of the country for this recognition. Colored or black is the correlative of white and does not demand this treatment.

It is well in speech making to make no reference to the race question. Leave out former experiences with colored people, forego any expression of your own lack of prejudice and omit the "darky" story in dialect. Make your talk as you would in any other neighborhood, illustrating it if possible with statistics especially related to the Negro. In every community certain amenities and certain standards arise to plague the uninitiated, and somehow these few points have gained fame among colored people as being the common errors of white speakers. These points may seem unimportant to you, but the fact that they are important to the Negro should be sufficient to cause you to give them consideration.

Having got this far, let us proceed to look for a contact point within the community itself. The Negro community is not unorganized. There will be leaders and pseudo-leaders. There will also be the usual proportion of fools, objectors, politicians, ambitious self-seekers and obstructionists. In this you will unfortunately recognize a normal condition for any community. But there will also be intelligent, earnest, unselfish, racial-minded leadership too. Naturally, it is important to make the right contact. Begin with your Council of Social Agencies which will very likely be able to point out a trained social worker of color who will be an invaluable guide. A list of the available agencies for your assistance will always run into a score or so in number. Last year in Chicago we had about 75 coöperating organizations during our observance of National Negro Health

Week. Some of the principal agencies follow.

A Negro medical society which often is made up of the physicians, dentists and pharmacists, combined into one organization. If there is a colored hospital in the community it will of course be of inestimable help. There is great interest in the development of these colored hospitals and, with their out patient, and often social service departments, they are invaluable, especially in follow-up work after a campaign involving physical examinations or treatment. In addition, the following agencies should be sought:

The Colored Press

Colored Public Health Workers, including nurses

Negro Health Week organization

Social Service organizations with qualified, trained, experienced workers in charge, such as,

1. The Urban League
2. The Young Men's Christian Association
3. The Young Women's Christian Association
4. The Community Center
5. Phyllis Wheatley Homes

Negro Business League

Negro Life Insurance Companies with their managers and agents

Churches and Church organizations

Interracial Commission

Fraternal groups

Women's clubs

Study clubs

Political organizations

Neighborhood clubs

Industrial workers' groups

Social clubs

Schools

Parent teacher associations

Boy Scouts

Girl Reserves

Barbers

Beauty shop operators

The neighborhood movie house

These agencies are very much like those to be found in any community and may be used in the same way.

Pioneer work in health education among Negroes has already been done by the National Negro Health Move-

ment, now under the supervision of the U. S. Public Health Service. This organization was founded by Booker T. Washington in 1915, and has developed from an early emphasis on clean-up activities, until today, in the various communities, according to their resources and leadership, it has assumed every phase of health conservation including pageants, keeping-fit methods, athletic contests, periodic health examinations and clinics for treatment. A *Health Week Bulletin* is issued and there is an annual poster contest. This annual observance is usually held in the spring at about the same time as the Early Diagnosis Campaign of the National Tuberculosis Association.

The importance of this movement lies in the fact that it has stimulated and kept alive the interest of colored people in health education. The following figures show the communities participating:

<i>Year</i>	<i>Communities Participated</i>
1925	139
1926	326
1927	405
1928	428
1929	464
1930	505

The National Negro Health Week celebration has been an effort coming from within the Negro community itself, financed from within the community, in most instances, and its direction and leadership emanating from the Negro group. Almost always it has the coöperation of the official and volunteer agencies. Of necessity it is often an indifferent job, while again often a very excellent piece of work is done. Official agencies, taking the lead in similar efforts, having improved methods of organization and greater resources could do the job infinitely better, and should.

In Chicago this work has been done in the name of a Health Council, un-

der the leadership of the Cook County Physicians Association, The Lincoln Dental Society, the Wabash Avenue Y.M.C.A. (which are colored organizations), and coöperating agencies. It is always well to get the medical men in early, and taking the lead. The secretary of the Y.M.C.A. is the active executive who pushes the work. A full-time social worker is almost imperative under the circumstances, if his organization will release him for several weeks in order that he may give the time to the immense amount of organization work preliminary to the campaign. Headquarters are maintained at the Y.M.C.A.

A thorough organization is set up with as many committees, and as many people contacted, as possible. This is done, not on the basis that all of them are going to work, but for its advertising value. The actual planning is kept in a small executive committee. Speakers are sent to churches, schools, and other public meetings several weeks in advance of the active campaign. Agents of the colored life insurance companies are called together in a mass meeting and interested in the work. They distribute pamphlets, posters and window cards advertising the meetings and the health examination clinic. They are given appointment cards for examinations to distribute on their debits, and turn these in in advance of the opening of the drive. During the 2 weeks of the campaign an effort is made to reach every church, school, and social gathering with a speaker or motion picture.

The campaign centers about a clinic for periodic health examinations at the Y.M.C.A. Motion pictures on health subjects are kept going for the waiting patients and a fine exhibit of educational posters and mechanical apparatus helps to hold their interest. The Municipal Tuberculosis Sanitarium erects a model fresh air school room and a

model sleeping porch. We use at least 6 examining rooms. Local surgical houses contribute tables, scales, test tubes, sterilizers and what-not for examination purposes. The dental equipment houses contribute 2 dental chairs and equipment for dental examinations. Many national agencies supply literature for distribution. Publicity is given by the white and colored press. In our most successful campaign in 1931, by stimulating the Health Department to examine one high school largely attended by colored students, we were able to count 3,375 babies, children, and adults who had been examined during this drive.

The management of the clinic may be of some interest. Mornings are given over to babies, afternoons to women, and evenings to men. The medical and dental societies adopt schedules for their members who volunteer their services. Each adult visits the clinic twice. On his first visit the patient's history is taken by nurses who give their services. Charts furnished by the American Medical Association are used. A specimen of urine and a blood Wassermann are taken from every applicant for examination. Provident Hospital and the Health Department take care of the laboratory work. These reports are assembled and the patient returns in a week, is examined, and advised according to his physical and laboratory findings. No treatment is given.

Another variant of this, but not so successful, was tried this year, when a complete roster of the medical and dental societies was distributed advising that during the 2 weeks of the campaign these examinations would be given free in any of the members' offices.

The advice given these patients is simple but thorough. They are told of the importance of physical examinations, that they should be repeated each year, that doctors are equipped to

make these examinations in their offices, and where impairments are found efforts are made to see that they are corrected.

The matter of awards in such educational work is important. For a number of years we gave cups and medals for the best teeth, the healthiest boy or girl, etc. A far more successful method is a certificate for every person examined. For a time we considered grading them A, B, or C, according to some loose standard of physical fitness. This was decided against and rather impressive certificates were made up like stock certificates and a gold seal placed on them. They are signed by the chairman and secretary of the Health Council and the presidents of the medical and dental societies. One year the Health Commissioner signed them, too. The certificates merely read, "This certifies that John Doe has been examined in the 1933 health examination clinic, thereby showing an interest in his physical condition, and further, he agrees to have such an examination annually. This is a real contribution to racial development."

It is surprising the amount of pride which is taken in these certificates. They are distributed at a final mass meeting and they serve the added purpose of making this meeting a success. Two nurses in white uniforms present them with all the formality of a graduation exercise. They are made out individually and rolled and placed impressively on the stage on two tables and the individuals' names are read out as they come forward. There is an attempt to give dignity and seriousness to this ceremony.

In planning a campaign among colored people you may well make your main objectives tuberculosis, for which the rate is from 2 to 6 times as high as for white; syphilis, for which there is also a high rate, and maternal and infant mortality, the rates for which

are about $2\frac{1}{2}$ times as high as for white mothers and babies.

In so far as the work done by official agencies among Negroes is concerned, the health department of the city of Detroit perhaps has been as successful as any.

In Detroit, the care of the Negro sick has been made largely the responsibility of the Negro doctor, under the direction of the city Health Department. But Detroit has an excellent Health Council in the matter of organization. So have Cleveland, Rochester, and Boston. No city, operating with a health council, surveying its field in preparation for a program, can conscientiously neglect as large a group as makes up the Negro community, ergo, form a health council, if not for the whole city, at least for the Negro community.

The foregoing should make it apparent that there are within the Negro community about the same elements for health educational efforts as are to be found in other communities. It is important to stress this point for two reasons. First, because it dispels any idea that different methods are necessary, and lets us see the problem as being one of similar design and unity. This is very important. Secondly, it also demonstrates that no new or different agencies are necessary to deal with the problem but, instead, it needs merely a broadening of the usual program to include the Negro. Perhaps one of the greatest hindrances to public health work among Negroes is the gradually failing notion that the Negro is biologically different. Often he is thought to be so different, indeed, that the public health worker just stands back and asks the question "What shall I do for the Negro?" and does nothing.

It has well been pointed out that while it might be very interesting to prove that there is a biological differ-

ence between whites and Negroes, one could really do nothing about it and it would likely have no effect upon control measures.

The whole problem involves several thousand state, county and municipal health departments. The best way to begin, is to begin. The best answer to the question of what shall I do for Negroes, is to ask the question "What have you done?" It is inconceivable, under any other circumstances, than those associated with race prejudice, that health officers can so complacently review, year after year, the unfavorable vital statistical reports of one-tenth of the population and make no special effort to correct it. In the meantime a magnificent chance for fame stands unaccepted. There is no greater opportunity for brilliant achievement, along all lines of public health work, than exists today in Negro communities. Public opinion can and should be changed. There is a moral responsibility, not being assumed even for the white population, when the black people are neglected. The great voluntary agencies need to stimulate interest in the interracial approach necessary. This is no more impossible, nor any less humanitarian, than the change of public opinion they have wrought in their various specialized fields.

Experienced public health workers attempting to visualize conditions and programs for a colored community should go back to what was accepted as being good 20 years ago and make that the starting point.

It should be realized that the Negro community today has a death rate comparable to that of the white rate of 20 years ago. Even this lagging behind is a great gain over the Negro rate of 30 years ago. Inevitably some effects of the nation-wide improvements in health conditions, though few were specifically directed toward the Negro,

have ameliorated his plight. Similarly, an improved Negro community health will lower the white rate further.

There is evident today a greater willingness than this country has ever known to experiment in social changes, under the inspired leadership of President Franklin Delano Roosevelt. The national administration stands emphatically for equality of wages, under the NRA, regardless of race, or color, despite the widespread inequalities heretofore responsible for so much of the low economic standing of the Negro which in turn contributed to low health

standards. This has a certain appositeness for the most desirable health conditions, and unless health officers plan a New Deal of equality of facilities, they must expect to be charged with plain stupidity.

Participation in these experimentations gives the greatest possible returns to the individuals so fortunately endowed as to be able to take part in the trends of the times. Such effort expended upon the Negro will come back in the form of his creative contributions to American life and in his better citizenship.

Clean Milk and Safe Milk

Clean milk is milk which has been produced and distributed with the minimum amount of extraneous contamination such as manure from the cow's udder and flanks, dust from the cowshed and dairy, and dirt from the milker's hands, utensils, and milk containers. When care is not exercised, such contamination readily occurs and dirty milk results. Dirty milk is not only esthetically objectionable but it also has poor keeping qualities, and for this reason alone reputable firms are anxious to obtain their supplies as clean as possible. Even if the dirt in milk contains no pathogenic organisms, the conditions which lead to dirty milk also

favor contamination with any pathogenic organisms which may be in a position to gain access to the milk.

It must be noted, however, that a clean milk is not by any means necessarily a safe milk. Milk obtained from a herd infected with tuberculosis or contagious abortion is never safe, no matter how cleanly it may be produced. Cleanliness of the general milk supply is desirable but cleanliness is not enough.

To insure its safety, that is to say, its freedom from pathogenic organisms, pasteurization is essential.—J. M. Hamill, M.D., *Lancet*, Dec. 30, 1933, p. 1498.

Relationship of *Shigella* Alkalescens to Other Members of the *Shigella* Group*

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THE organism designated by Andrewes¹ as *B. alkalescens* was considered by him and has been considered since its discovery to be non-pathogenic. Its isolation, even in diseases where no other etiological agent could be demonstrated, has been described generally as of no significance. We feel it is probably because of this, that *Shigella alkalescens* has not received the attention its presence in urine or feces justifies. In our studies of this organism during the past 8 months we have made special efforts to demonstrate it in both normal and abnormal feces and urines. The organism was always found associated with definite disease conditions.

Andrewes¹ was not able to study completely the pathogenicity of his cultures for rabbits. He states: "These experiments, few as they are, suggest that *B. alkalescens* is devoid of pathogenic power and separate it sharply from the Flexner Y group." His experiments showed further that there was no cross-agglutination with Flexner Y sera and indicated that the serological relationship of *B. alkalescens* and *B. dispar* with the Flexner Y group was remote, although he states, "There was a suggestion of some small element in

OUTLINE OF CASE REPORTS

Several strains of *Shigella alkalescens* were isolated in an outbreak of dysentery at the Brown University Infirmary, Providence, R. I. This outbreak was the second that had occurred within a few weeks. No bacteriological studies had been made of the first outbreak. In the second, several students and 2 nurses developed symptoms of dysentery.

perience have now been approved by other committees of the American Public Health Association and of the State and Provincial Health Authorities. An item on meat inspection is also included.

The committee, in its work on revision, has tried to keep pace with changing practices and new knowledge, and at the same time avoid unnecessary expansion or complication. To some degree the new items will require a change in local record keeping in order to assemble the material in the form specified. The 5-year interval between revisions is intended to avoid disturbing established routines unnecessarily.

One new feature of the *Form* is an expansion of the preliminary section relating to demographic data. Graphs have been introduced to show the distribution of death rates from specific causes in a wide array of cities. This permits a community to compare its position in these particulars with the general run of cities. A description is also given of the means of adjusting rates to a standard million of population, thus eliminating the artificial differences in rates due to different proportions of the population within age groups.

The new *Form* facilitates the recording of all services of a public health nature, including those performed by private practitioners which have been difficult to obtain heretofore, as well as those of official and voluntary agencies.

The limitations of the *Form* are discussed very frankly in the Introductory Statement. Its standards are based on professional group judgment of the day and on results now being attained in

many instances by at least a quarter of the cities whose information is available. It is not expected that a city should modify its activities solely for the purpose of increasing its score when the best judgment of the community is that the local situation dictates otherwise. The *Form* is to be considered as a useful, guiding instrument rather than as an inflexible pattern. Its aim is not to hamper but to help.

The *Form* will be used by the Field Director of the Committee on Administrative Practice when called in by cities for surveys. It will be found useful to health officers particularly in cities having over 25,000 population, and even in smaller cities. It will be extremely helpful to the Committee on Administrative Practice if health officers after scoring their cities will forward a copy of the completed *Form* to the American Public Health Association office. No publication will be made of scores without the permission of the health officer. Information as to the performance of cities with respect to the detailed items will help in keeping the central office acquainted with current practice and will also prove valuable in later revisions.

Membership of Committee includes: Earl G. Brown, M.D., A. Grant Fleming, M.D., Allen W. Freeman, M.D., Theresa Kraker Guthrie, R.N., George D. Lummis, M.D., Frank J. Osborne, L. J. Roper, M.D., John J. Sippy, M.D., Henry F. Vaughan, Dr.P.H., W. F. Walker, Dr.P.H.; representatives from Health Officers Section, Leon Banov, M.D., James Roberts, M.D., H. A. Streeter, M.D., I. F. Thompson, M.D.

Ex-officio, Carl E. Buck, Dr.P.H., Field Director, Committee on Administrative Practice.

TABLE V
NEUTRALIZING EFFECT OF SHIGA ANTI-FILTRATE HORSE SERUM ON
ALKALESCEUS FILTRATES IN MICE

Filtrate Diluted 1:10	Filtrate Injected	Serum Injected	Mouse Number	Results	Remarks
89875	0.5 Ml	0	A	Dead	Control
	0.5 "	0	B	"	"
	0.5 "	0	C	"	"
	0.5 "	0	D	"	"
	0.7 "	0.2 ml.	E	Survived	Test
	0.7 "	0.3 "	F	"	"
	0.7 "	0.4 "	G	"	"
	0.7 "	0.5 "	H	"	"
6586	0.5 "	0	I	Dead	Control
	0.5 "	0	J	"	"
	0.5 "	0	K	"	"
	0.5 "	0	*L	Survived	"
	0.7 "	0.2 ml.	M	"	Test
	0.7 "	0.3 "	N	"	"
	0.7 "	0.4 "	O	"	"
	0.7 "	0.5 "	P	"	"
19703	0.5 "	0	Q	Dead	Control
	0.5 "	0	R	"	"
	0.5 "	0	S	"	"
	0.5 "	0	T	"	"
	0.7 "	0.2 ml.	U	Survived	Test
	0.7 "	0.3 "	V	"	"
	0.7 "	0.4 "	W	"	"
	0.7 "	0.5 "	X	"	"

* One out of twelve control mice survived.

Shigella alkaescens we find this organism listed as "not pathogenic." The only reference to actual attempts to demonstrate this non-pathogenicity were made by Andrewes¹ who notes that only a few animals were used for this work. The authors could find no reference to isolation of this organism from known cases of dysentery-like diseases.

In previous isolations of *Shigella alkaescens* from cases of enteric and other diseases, particularly chronic nephritis, we paid little attention to it, considering it of no etiological significance. We found however in a careful

study of such cases that in spite of definite symptoms of infection no other organism could be demonstrated to account for these symptoms.

When an outbreak of dysentery occurred in a university infirmary (reported in another section of this paper) and *Shigella alkaescens* was isolated repeatedly not only from the stools of the cases but also from an apparently healthy food handler, it appeared that we had definite indication of the pathogenicity of this organism for man. After a period of time the individuals ill with dysentery showed definite agglutinins in their blood

stream for *Shigella alkalescens*. On removal of the food handler involved no further cases developed. These findings indicated the etiological relationship of this organism to these cases.

Four additional cases are reported which were clinically diagnosed as chronic nephritis. There were no symptoms of dysentery. *Shigella alkalescens* was isolated from each. No other significant organism could be demonstrated either in catheterized urines or in stools.

From a study of the morphological characteristics of the *Shigella alkalescens* strains we found very little either in colonial or microscopic appearance that would separate them from those organisms in the dysentery group described as pathogens. In some instances there was a tendency for the colonies to show a blue pigment on eosin-methylene-blue agar after 48 hours. On the other hand, we find this to be true of some of the dysentery strains, particularly *Shigella paradysenteriae* Sonne, which the authors have reported elsewhere.

The biochemical reactions of *Shigella alkalescens* were constant over a period of 6 months and showed sufficient differences to separate it from the true Flexner and Shiga types. In our studies the production of an acid reaction by this organism in dulcitol and rhamnose and the tendency to give an alkaline reaction in litmus milk seemed sufficient to distinguish it from the other members of the *Shigella* group.

By agglutination and agglutinin absorption we were able to demonstrate a definite relationship of *Shigella alkalescens* to some members of the dysentery group (*i.e.* Harris, Hiss, Strong, Army and Shiga types) and, although this relationship is not as strong as that demonstrated previously for *Shigella dispar*, the consistency of our results on repeated trials appears

sufficient to demonstrate that a relationship exists.

The use of the Schwartzman reaction for demonstrating the relationship of organisms within a given group, such as the intestinal group, was demonstrated by one of us with Ecker⁸ in an earlier publication. We were able to show when the skin of rabbits was prepared with filtrates of intestinal bacteria such as *Escherichia coli*, *Salmonella schottmülleri*, *Salmonella enteritidis* and others that it was not possible to elicit the Schwartzman reaction by means of organisms such as the enterococcus. Since that time, however, Schwartzman⁹ has shown that it is possible to prepare the skin of rabbits with *Eberthella typhi* filtrates of high skin-preparatory potency and to elicit the reaction by means of an intravenous injection of pneumococcus filtrates. These pneumococcus filtrates had no skin-preparatory potency; *i.e.*, they were incapable of sensitizing the skin of rabbits, although possessing definite reacting potency; *i.e.*, an intravenous injection of pneumococcus filtrate would elicit a Schwartzman reaction provided the skin was prepared with a filtrate containing a high concentration of skin-preparatory factors. The fact that heterologous filtrates are capable of eliciting the Schwartzman reaction would necessarily be contraindicative of the specificity of the reaction. However, where it has been demonstrated that heterologous filtrates have been used successfully, the filtrate used in sensitizing the skin had a high concentration of skin-preparatory substances. A similar result is not possible with the ordinary filtrate.

All filtrates used in this investigation were prepared under the same conditions and concentrated as nearly as possible to the same volume *in vacuo*. Each filtrate except that of the Shiga type was shown to contain both skin-preparatory and reacting factors (Shiga

filtrate showed reacting factors only). Under these circumstances and in view of the results obtained where it was shown that various *alkalescens* filtrates would prepare the skin of rabbits for intravenous doses of Flexner and Shiga strains, it appears that these findings are indicative at least of a group relationship.

The results obtained in the attempts to neutralize the toxic effect of the *alkalescens* filtrates with Shiga anti-filtrate horse serum further augment our findings. These experiments show definitely that Shiga antifiltrate serum under the proper conditions of experimentation will neutralize the effects of the second or intravenous injections of *alkalescens* filtrates in the Shwartzman test in rabbits and further that the lethal action of these filtrates on mice can be destroyed by the addition, in the proper concentrations, of Shiga anti-filtrate serum.

SUMMARY AND CONCLUSIONS

1. Cases of dysentery-like diseases and others apparently caused by *Shigella alkalescens* are reported.
2. The relationship of *Shigella alkalescens* to other members of the dysentery group is demonstrated by means of agglutination, agglutinin absorption and the Shwartzman phenomenon.
3. Shiga anti-filtrate horse serum neutralizes in rabbits and mice the toxic effect of *Shigella alkalescens* filtrates.

4. This investigation indicates that *Shigella alkalescens* should be included among those organisms in the *Shigella* group capable of causing disease in man.

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Examination of Fermented Foods by Laboratory Methods*

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THE studies of the last few years, in which a number of samples of sauerkraut have been examined, have shown that a better inspection control of fermented foods is desirable. Although this work has dealt primarily with sauerkraut, it is believed that many of the conditions observed hold true for other fermented foods, such as pickles and olives, as well as relishes prepared from various fermented vegetables; but results of definite laboratory analyses of these products have either never been published, or methods for examination have not been developed. Vinegar might be included in a broad discussion of fermented products, but methods of examination as well as regulations are quite well standardized for this product. The fermented foods here discussed include only those products that result from a lactic acid fermentation, thereby excluding vinegar, as well as beers, wines, etc.

In a report on the quality of commercial sauerkraut,¹ 8 per cent of the samples analyzed were described as unsatisfactory, while 14 per cent were described as of poor quality. This does not indicate that anyone consuming such food is in danger of suffering from poisoning, for it is known that the growth of organisms causing food poi-

sonings does not normally occur during the lactic acid fermentation. Rather, the control of this foodstuff should be considered from the standpoint of decency in packing an edible product and of protecting the consumer against fraud. Fortunately, many fermented products, such as pickles and olives, used as condiments, are packed in glass so that the consumer may see what is purchased. Sauerkraut, on the other hand, since it is inexpensive, is usually sold in cans or in bulk. Because of this and of the fact that more is known about methods of analyzing this product, the discussion will be confined to sauerkraut.

Sauerkraut is not even mentioned in some books on foods and their adulteration. Dr. W. B. White (Chief of Food Control of the U. S. Food and Drug Administration) in referring to sauerkraut in a letter states: "We have never been able to develop methods to substantiate organoleptic evidence of decomposition." In the various seizures by the Government under the Food and Drugs Act, of which there have been few, the sauerkraut has usually been described in the legal complaint as containing decomposed material.

Regulations specify that sauerkraut shall be

... the clean, sound product of characteristic flavor obtained by full fermentation, chiefly lactic, of properly prepared and shredded cabbage in the presence of not less than 2 per cent nor more than 3 per cent of salt. It contains, upon completion of the

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Approved by the Director of the New York State Agri. Exper. Sta. for publication as *Journal Paper No. 15*, October 5, 1933.

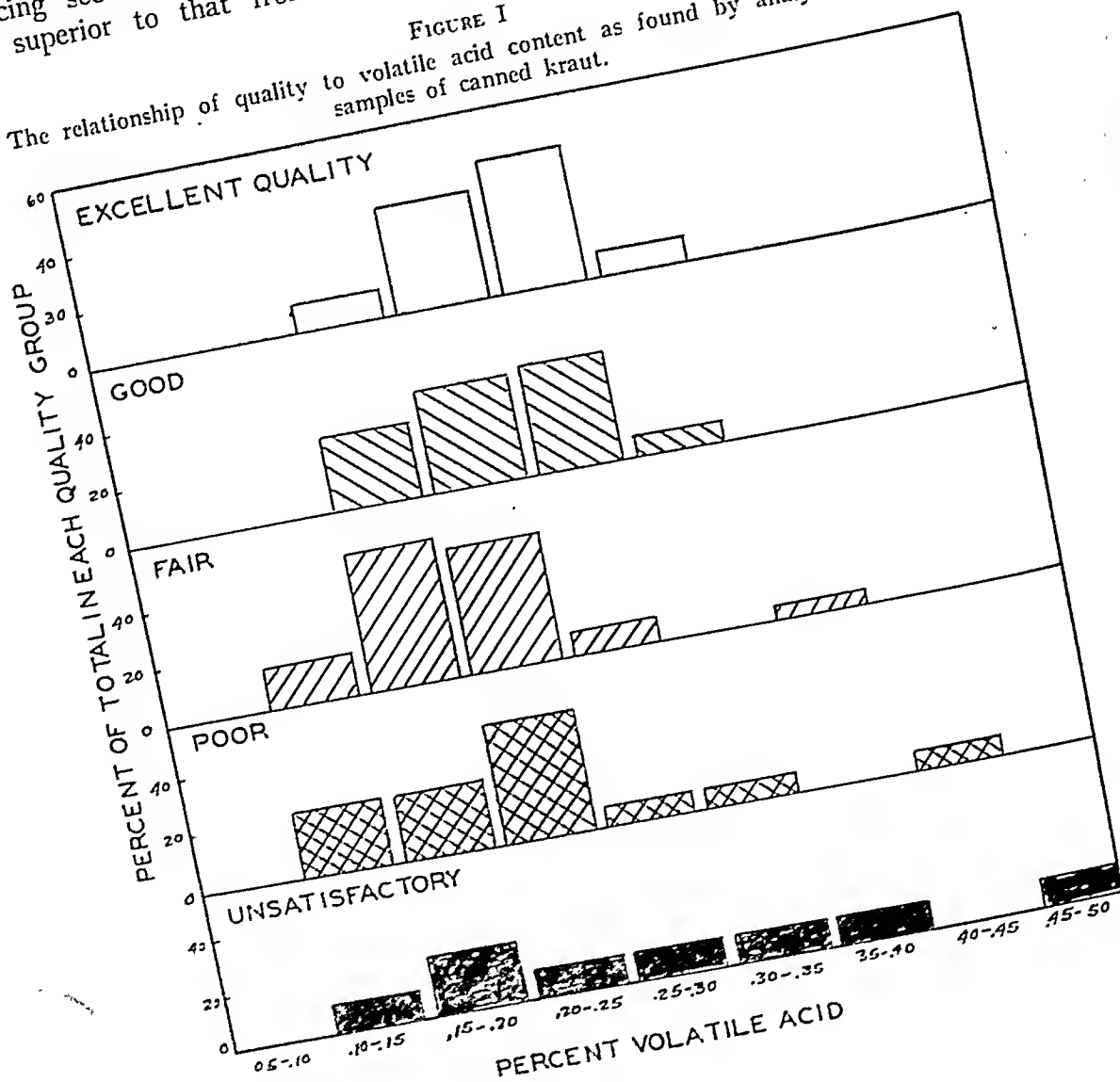
fermentation, not less than $1\frac{1}{2}$ per cent of acid expressed as lactic acid. Sauerkraut which has been rebrined in the process of canning contains not less than 1 per cent of acid.

In the analysis of over 100 samples of kraut obtained from more than 70 different packers throughout the United States, at least one-third were found by direct analyses not to conform to the above definition. It is true that this does not necessarily mean that a third of the pack was poor, since observation has shown that the kraut from the big producing sections, on the whole, is quite superior to that from sections

where the industry is not so well developed. However, there are individual companies in all sections that are careless in the preparation of their pack.

Some of the cans of kraut examined in this series of analyses were really unfit for consumption. The astonishing thing is that some canners would think of packing products that are unfit for consumption. Two samples were as green as spinach; others were pink. Some had a definitely unpleasant odor and flavor caused by secondary fermentations. One sample had a fishy flavor, and a few resembled rotten rather than fermented cabbage. The

FIGURE I
The relationship of quality to volatile acid content as found by analysis of 102 samples of canned kraut.



analyses of a few of these may be interesting.

These analyses have been based on research methods, but it is believed that they might be developed into routine control procedures. Salt was determined by direct titrations with silver nitrate, using potassium chromate as indicator; total acid by direct titration with phenolphthalein as indicator; volatile acid by steam distillation; non-volatile acid by difference; and alcohol by distillation from an alkaline solution, its oxidation to acetic acid by bichromate and steam distillation to secure the volatile acid. A supplemental microscopic examination of the juice for yeasts is often helpful if secondary fermentations are suspected.

Certain comments may be made before going further. The direct titration of salt is far more accurate than any method of sampling, it having proved to be very difficult to get a representative sample for salt determinations from vats of sauerkraut. The results secured by direct titration for total acid are from 0.1 to 0.2 per cent below the actual content of acid as obtained by extraction methods. The determination of the amount of volatile acid depends upon the acidity of the juice and the amount of steam distillate collected. In the analyses made, the juice was not acidified by addition of mineral acid, and 1,600 c.c. of distillate was collected from 500 c.c. of sauerkraut juice. Adding sulphuric acid increases slightly the amount of acid distilled over. Since lactic acid is slightly volatile, increasing the amount of distillate increases the apparent volatile acid. The alcoholic determination is fairly accurate, although in canned krauts the alcohol may have been partially volatilized before canning was completed.

These determinations are at times significant in relating the quality of

canned as well as bulk kraut to the fermentation and packing. In other words, the interpretation of the results of these analyses may be made in such a way as to reveal some of the past history of the kraut. It has been shown that in a normal fermentation of sauerkraut, a definite sequence of growth of various types of organisms takes place. The first few days of active fermentation is carried on by a group of acid and gas producing cocci, *Leuconostoc mesenteroides* Van Tieghem. They produce volatile acid, carbon dioxide, and alcohol, as well as lactic acid, and are partly responsible for the flavor of kraut. The fermentation is completed by the lactic acid producing rod *Lactobacillus cucumeris* Bergey *et al.*, and the acid and gas producing rod *Lactobacillus pentoaceticus* Fred, Peterson and Davenport. The part each of these plays in the fermentation is influenced by the amount of salt present as well as the temperature of fermentation. Using the above method of analysis, canned kraut which had been fermented normally, and properly canned, will reveal an alcohol content of from 0.1 to 0.3 per cent and a volatile acid content of from 0.2 to 0.32 per cent.

A few results are given to illustrate the way in which analyses may be interpreted (Table I).

The total acid (3rd column) is an indication of the degree of fermentation. Partially fermented kraut (*e.g.*, No. 50) shows a low total acid content, and may be slightly bitter. On the other hand, fully fermented kraut may be diluted to such an extent in canning (*e.g.*, Brand No. 93, Table I) that the acid is low. But in this case, the salt, volatile acid, and alcohol content are also diluted and therefore yield low values.

The quantity of salt originally present has a direct bearing on the texture.

TABLE I
ANALYSIS OF 6 CANS OF POOR QUALITY KRAUT CONTRASTED WITH THE ANALYSIS OF
2 CANS OF EXCELLENT KRAUT

Brand Number	Salt Per cent	Total acid as lactic acid Per cent	Volatile acid as acetic acid Per cent	Non-volatile acid as lactic acid Per cent	Ratio	Alcohol Per cent	Length of Cut*	Texture†	Color‡	Odor‡	Flavor‡	Remarks
54	3.2	1.40	0.47	0.69	0.68	0.45	L	S	P	U	U	Rotted
94	1.9	1.01	0.30	0.56	0.54	0.09	S	S	F	U	U	Fishy
93	1.6	0.62	0.11	0.46	0.22	0.09	M	S	G	F	P	Washed out, flat
12	1.6	1.42	0.25	1.04	0.24	0.36	M	F	G	U	U	Secondary fermentation
50	1.3	0.74	0.19	0.45	0.42	0.40	M	S	P	P	U	Very abnormal
14	0.7	1.28	0.28	0.86	0.32	0.18	M	S	G	G	F	Too soft
3	2.2	1.30	0.21	0.99	0.21	0.23	M	F	G	E	E	Excellent
5	2.4	1.48	0.29	1.04	0.28	0.29	L	F	E	E	E	Excellent

*L = Long, M = Medium, S = Short.

†F = Firm, M = Medium, S = Soft.

‡E = Excellent, G = Good, F = Fair, P = Poor, U = Unsatisfactory.
Abnormal chemical results are indicated by bold face type.

Very frequently fermentation carried out with a low salt content is expressed by a soft textured product (*e.g.*, Table I, Brands Nos. 50 and 14). The relation of salt concentration to texture is shown in Table II. Kraut that has

a high salt content during fermentation is often discolored, sometimes pink, and usually has an abnormal flavor. Fermentation is abnormal in such cases and as a result the volatile acid may be low and the alcohol content high.

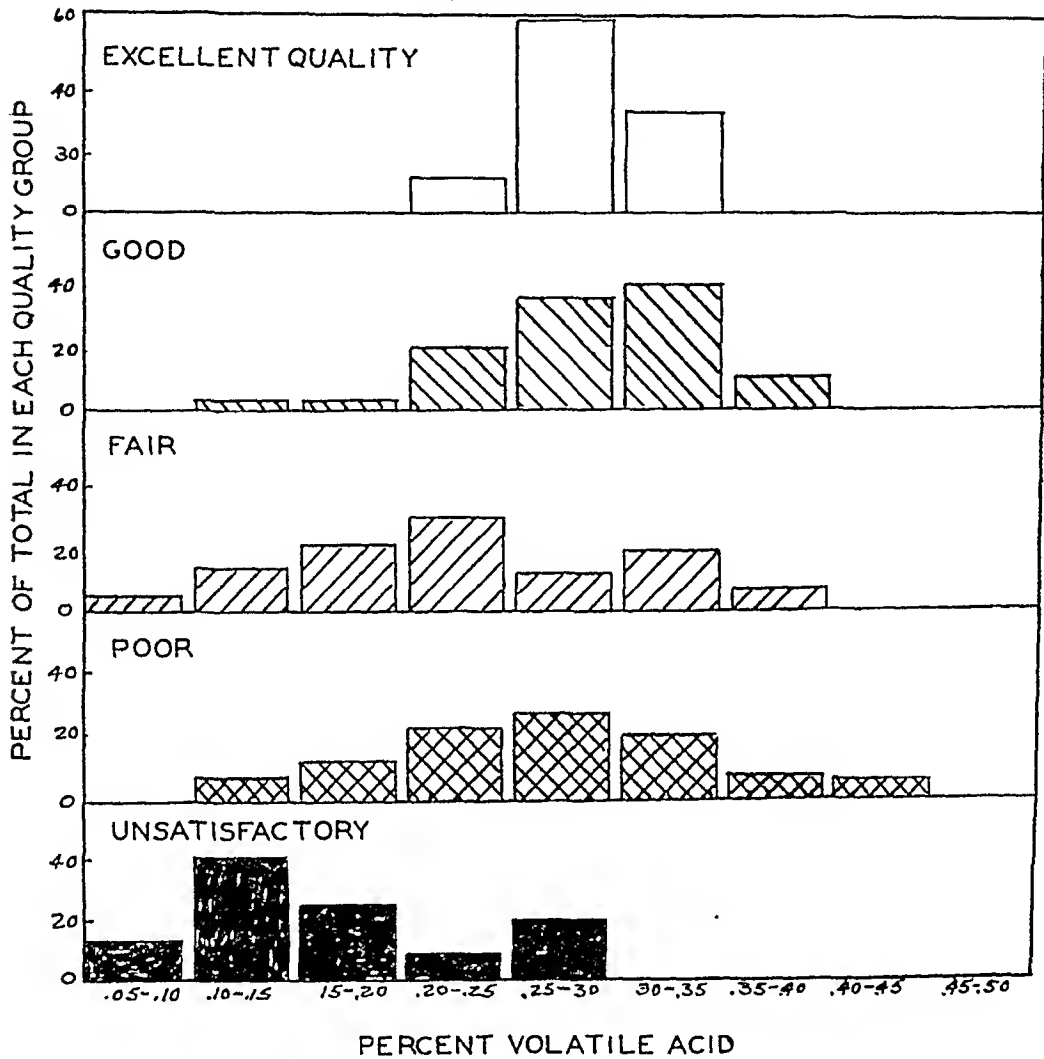
TABLE II
THE RELATION OF SALT CONCENTRATION
TO TEXTURE IN CANNED KRAUT

Number of Samples	Salt Per Cent	Percentage of samples of Soft Texture	Salt Content
5	2.8-3.4	60	Too high
28	2.2-2.5	7	
37	1.8-2.1	22	Normal
22	1.5-1.7	41	
10	0.7-1.4	80	Too Low

Volatile acid (largely acetic) is almost entirely produced by the organisms that start the fermentation process, and is present usually in quantities of about 0.25 per cent in canned kraut, and slightly higher (0.28 per cent) in bulk kraut. Considerable variation from this may be found. A volatile acid content above 0.32 per cent or below 0.20 per cent is often an indication either of an abnormal fermentation, or of a secondary fermentation. The former may be due to the fermentation having taken place at too high a temperature, to faulty salting or packing. Secondary fermentations

FIGURE II

The relationship of quality to volatile acid content as found by analysis of 184 samples of bulk kraut.



often result in the destruction of acid. The volatile acid content is often abnormal in the poor quality samples. A summary of the relationship of quality to volatile acid content in canned kraut as found from the analyses is given in Figure I. From these figures it may be noted that the volatile acid content of the good and excellent krauts all fall within 0.15 to 0.35 per cent. Samples rating poorer than this more often show analyses lower or higher. A similar summary for a number of bulk krauts is given in Figure II. The relationship is similar in this case, but the total volatile acid figures are slightly

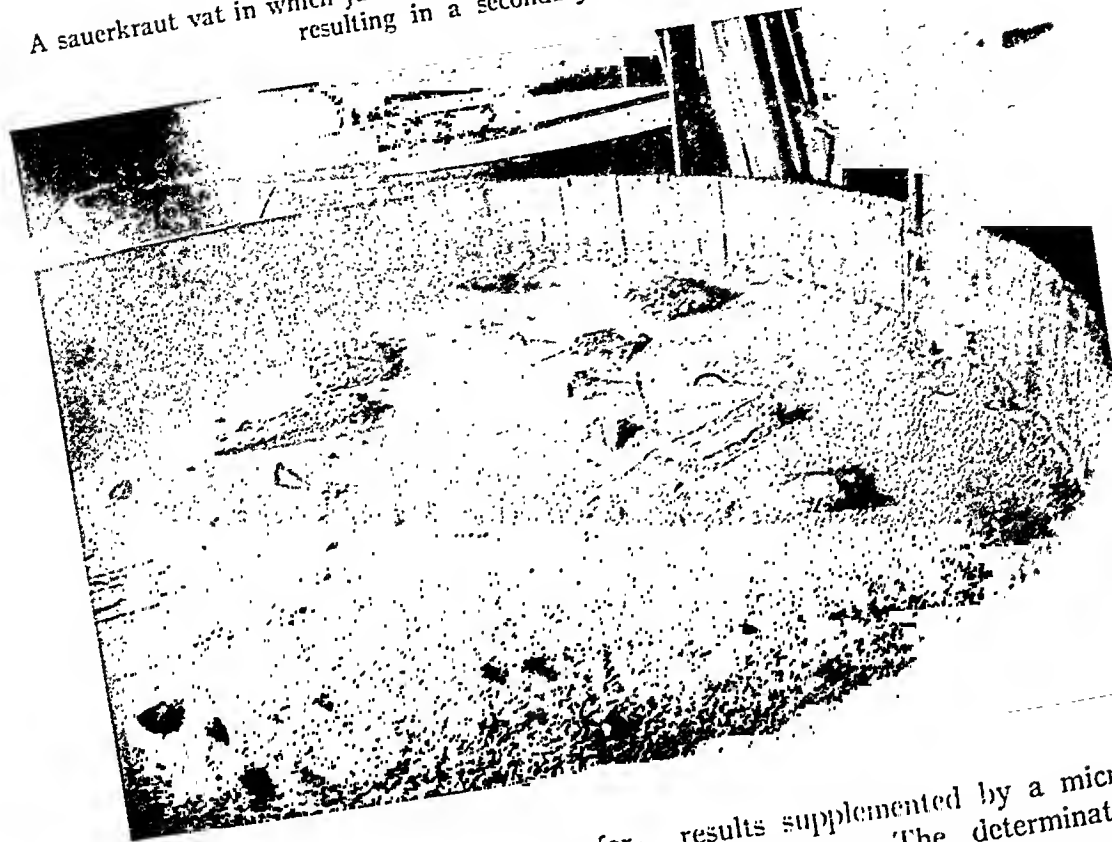
higher, there being no dilution of acid as in canning.

Secondary fermentations of kraut are usually caused by yeasts (Figure III). They manifest themselves in a peculiar yeasty or even putrid odor. Often their action can be detected by an increased alcohol content, sometimes by the presence of yeast cells and occasionally by cocci in a microscopic preparation. The quantity of alcohol present in bulk kraut is normally somewhat higher than in canned kraut.

A form of manipulation that is difficult to detect is the washing of discolored kraut, such as pink kraut, a

FIGURE III

A sauerkraut vat in which juice has covered the boards. Yeast grows on the surface resulting in a secondary fermentation.



condition caused by a secondary fermentation. Such kraut may show proper color and texture, but usually has an undesirable flavor. In these cases unless the kraut is canned in brine from another tank, the canned product will be found uniformly low in total acid, volatile acid and salt.

In conclusion, it may be stated briefly that the quality of kraut bears a definite relation to its chemical composition. Defects in fermentation or in canning can often be detected by careful analyses and proper interpretation of the

results supplemented by a microscopic examination. The determinations of total acid and salt are simple procedures and the results are fairly definite. The determinations for alcohol and volatile acid are comparative and very frequently reveal defects in this food product. Microscopic examination is valuable at times as a means of detecting secondary fermentations.

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The Committee on Professional Education

THE Committee on Professional Education was provided as a fifth standing committee by the Governing Council of the American Public Health Association at the Annual Meeting in Washington, 1932. Although this action was taken the actual appointment of the committee was not completed until the early part of 1933. This committee was established to replace the Committee on Training and Personnel which was a sub-committee of the Committee on Research and Standards.

The purpose of the Committee on Professional Education is to carry on studies and determine standards for the professional education of those who wish to adopt public health work as a career, and perform such other functions along this line as will raise the level of efficiency in public health administration and in the specialized phases of public health.

The By-laws provide that the committee shall consist of 10 members. The committee personnel is at the end of this report. The personnel of this committee was approved by the Executive Board at its meeting in March, 1933.

The amount of \$1,000 has been allocated by the Finance Committee for the Committee on Professional Education; \$500 of this amount is designated for travelling expenses, and the remainder for the salary of a part-time secretary.

This committee held its first meeting in New York on May 6, 1933. It was attended by all members with the exception of one who was unavoidably detained. This session of the com-

mittee was devoted entirely to a discussion of policies and objectives. A communication was sent to each member by the chairman prior to the meeting requesting that he indicate what he thought should be the activities of the committee. These communications were presented at this meeting and in a considerable measure stimulated the discussion which occurred. The primary purpose of the meeting was to determine the elements that should be considered in formulating a program. Definite progress was made in accomplishing this purpose.

As a result of this discussion it was thought desirable to consider the following problems in the initial activities of the committee.

1. Qualifications, Certification, and Licensure of Health Officers
2. Professional Qualifications of Public Health Nurses
3. Qualifications of Sanitary Engineers and Sanitary Officers (Inspectors)

It was the consensus of opinion that this work should be done under the direction of three sub-committees. The committee authorized the appointment of the following sub-committees.

Sub-committee on Qualifications, Certification, and Licensure of Health Officers

Allen W. Freeman, M.D., *Chairman*
Huntington Williams, M.D.
Thomas Parran, Jr., M.D.
C. E. Turner, Dr.P.H.
W. G. Smillie, M.D.
Stanley H. Osborn, M.D.
Clarence L. Scamman, M.D.
W. P. Shepard, M.D., *Consultant*

Sub-committee on Professional Qualifications of Public Health Nurses

Lillian Hudson, R.N., *Chairman*
 Clarence L. Scamman, M.D.
 Dorothy Carter, R.N.

Sub-committee on Qualifications of Sanitary Engineers and Sanitary Officers (Inspectors)

Ralph Tarbett, C.E., *Chairman*
 H. G. Baity, Sc.D.
 Arthur P. Miller, C.E.
 Walter S. Mangold
 J. L. Barron
 H. H. Howard, M.D., *Consultant*

The work of these sub-committees is progressing satisfactorily.

THE INSTRUCTION OF MEDICAL STUDENTS
 IN PREVENTIVE MEDICINE AND
 PUBLIC HEALTH

It was the sense of the committee that there is great importance attached to the proper instruction of medical students concerning the prevention of disease and the measures employed in public health administration. Obviously this is not being done well in medical schools at the present time. This question was discussed at some length and a sub-committee appointed consisting of Dr. W. G. Smillie, *Chairman*, Dr. W. S. Leathers and Dr. Kendall Emerson. This sub-committee was requested to prepare a memorandum with reference to this problem and present it to the Council on Medical Education, Licensure and Hospitals of the American Medical Association at its next session with a view of enlisting its interest and coöperation in stimulating changes in the medical curriculum so that students may obtain more adequate instruction in the preventive and public health aspects of medical service.

Another meeting of the Committee on Professional Education was held in New York on December 17, 1933, for the

purpose of receiving reports from the sub-committees and to determine more definitely the program for future activities.

A report was made by Dr. Freeman, *Chairman* of the Sub-committee on Qualifications, Certification, and Licensure of Health Officers, on certain principles which underlie the work of the committee, with particular reference to qualifications. After considerable discussion this report was adopted.

A report was made by Miss Hudson, *Chairman* of the Sub-committee on Professional Qualifications of Public Health Nurses, as follows:

I. Review

A. Definition of Public Health Nurse

B. Minimum Qualifications for those Appointed to Positions in Public Health Nursing

Those qualifications, adopted in 1931, will be reviewed on the basis of the findings in a recent survey made by the National Organization of Public Health Nursing. Recommendations will be made as to whether or not changes are desirable.

II. It was further agreed that the sub-committee should study the desirability of certification of public health nurses on a State or National basis.

Since the committee has met, the following has been done which may be of interest:

1. No decision has been reached as far as changing the term "Public Health Nurse" is concerned.

2. A slight change has been made in the definition of Public Health Nurse—the term "application of" having been eliminated.

This report was accepted.

Mr. Miller, in the absence of the Chairman, made a preliminary report of

the Committee on Qualifications of Sanitary Engineers and Sanitary Officers (Inspectors). He stated that much can be done to improve the training of public health engineers; that the engineering courses include too much design. The committee should also strive to elevate the standards of the sanitary officer or inspector. It is desirable to raise the qualifications for this grade of public health personnel and establish standards which will more definitely establish the status of the sanitary officer or inspector as a health worker. Mr. Miller's report was accepted.

Dr. Smillie made a report with reference to a conference with the Council on Medical Education, Licensure and Hospitals of the American Medical Association and stated that the Secretary, Dr. W. D. Cutter, agreed to have a paper on the teaching of preventive medicine on the program at the meeting in Chicago in February, 1934. The committee expressed appreciation for achieving this result.

It was the sense of the committee that a dinner session should be arranged each year during the Annual Meeting of the American Public Health

Association for the purpose of stimulating discussion concerning certain important problems in the field of professional education.

It was voted that the chairman of each of the three sub-committees be requested to bring in a report from his sub-committee concerning the minimum qualifications of health officers, public health nurses, sanitary engineers, and sanitary officers (inspectors), respectively for consideration of the main committee at its next meeting.

The discussions of the committee were stimulating and constructive and as expressed by one member, Dr. Sundwall, in a recent communication to the chairman, "the meeting was in every way worth while and real progress was made."

W. S. LEATHERS, M.D., *Chairman*

C. E. TURNER, DR.P.H., *Secretary*

LILLIAN A. HUDSON, R.N.

JOHN SUNDWALL, M.D.

HUNTINGTON WILLIAMS, M.D.

ALLEN W. FREEMAN, M.D.

THOMAS PARRAN, JR., M.D.

RALPH TARBETT, C.E.

CLARENCE L. SCAMMAN, M.D.

W. G. SMILLIE, M.D.

EDITORIAL SECTION

Expressions of opinion and statements of supposed facts are published on authority of the writer under whose name they appear, and are not to be regarded as expressing the views of the American Public Health Association, unless such statements or opinions have been adopted by vote of the Association.

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	RAYMOND S. PATTERSON, Ph.D., Bibliography

SAFE MILK

IT is hard to say too much on the subject of safe milk and its importance to the younger portion of our population. In the United States we are proud in believing that we come pretty near to leading the world in the precautions that we have taken and in the response of the dealers. There is abundant evidence, however, that other countries, not only in Europe but on this side of the water, are doing their best to make things as good as possible.

The January number of the *Canadian Public Health Journal* is called "Special Milk Number," and is devoted entirely to the various aspects of milk production. That country and the provinces of which it is made up, have gone through the same sort of opposition which we encountered over here, but it is most interesting to note that in 1921, the Saskatchewan Dairy Association passed resolutions favoring legislation in cities for the compulsory pasteurization of all milk and cream. Somewhat later, the National Dairy Council of Canada endorsed the principle of pasteurization, and in 1933, in Ontario, the producers and distributors adopted a province-wide law requiring pasteurization in towns and cities. In other parts of Canada, somewhat similar movements have taken place and some of them have laws requiring the counsel and advice of provincial departments of health for the approval of plans for pasteurization plants. In Saskatchewan, Manitoba and Quebec, such provisions have already been incorporated in the laws, and in others the movement is going forward. The filing of plans for such plants is closely associated with the question of licensing, which seems to be extending in our sister country very rapidly, insuring a system of adequate supervision. Canada has had some very severe lessons, notably the epidemic in Montreal in 1927, in which there were 5,002 cases, with 533 deaths. From the period 1906-1919 inclusive, but 6 epidemics were recorded, while in a similar period, 1920-1933, there were 42. While increase in population may have had something to do with this increase in epidemics, the authorities believe that the difference shows clearly the

active participation of health authorities, local and provincial, in the care of milk and the investigation of diseases. The following epidemics have been recorded:

	<i>Epidemics</i>	<i>Cases</i>	<i>Deaths</i>
Typhoid	35	6,514	674
Paratyphoid	3	522	3
Scarlet	7	192	0
Septic Sore Throat	3	584	4
	<hr/> 48	<hr/> 7,812	<hr/> 681

Pasteurization is not as widespread in Canada as might be desired. According to available statistics, only 25 municipalities require that all milk sold be pasteurized. Altogether, a population of 3,067,362 is served with pasteurized milk to a greater or less extent. Only 5 of these report that 100 per cent of their milk is pasteurized, 12 of them reporting that 100 per cent of the cattle furnishing the milk is tuberculin tested. As a rule, the cities that endorse pasteurization most strictly are those in which tuberculin testing is best carried out, but there are some notable exceptions. Windsor and St. Catharines, for example, apparently depend almost entirely on pasteurization, the tuberculin testing running only 5 per cent for the former city, and 8 per cent for the latter.

The review of the situation in Canada includes a short but excellent study of the nutritional value of pasteurized milk, ending with the conclusion that observations on large groups of children have shown that growth is as satisfactory with pasteurized milk as with raw, and pointing out that calcium is the only valuable dietary constituent which is affected, and ending with the advice that some source of vitamin C be included in the diet.

This Special Milk Number is full of interest and can be recommended for study by all health officers, producers and distributors.

ORAL HYGIENE

ONE has only to scan the literature casually to recognize the prominent place in prevention of disease that oral hygiene has come to occupy. When one tries to write on the subject—except for fundamental principles which are generally accepted—he finds himself lost in a maze of contradictions and uncertainties; yet we feel that all interested in this phase of preventive medicine should attempt to keep up with the advances which are being made.

For some years attention has been largely focused on the part played by vitamins in the development of the teeth, and to some extent even in the arrest of caries. All agree that proper nutrition plays a large part in the development of the teeth, but it is equally sure that proper development may be a very different thing from proper maintenance. It has not yet been shown whether these different requirements are quantitative or qualitative.¹

Many studies have been made on the composition of teeth, and Hoppe-Seyler as early as 1881, pointed out that the dentine of the tooth might be called bone in its purest form. Many studies have been made also on mineral metabolism, especially calcium and phosphorus. Some authentic work has shown that during the last month of pregnancy there is a loss of calcium amounting in some cases to 0.5 gram per day. Long before these observations, the old saying, "A tooth for every child," was common. In some of the lower animals, when the

mother receives a poor diet during pregnancy and lactation, the teeth of the offspring show less calcification. Sherman has shown that in American diets, if there is a deficiency, it is likely to be in respect to calcium. On such findings is based the advice, so widely given, to use milk, since the average calcium requirement of children is about 1 gram per day, and milk is our best source for this element. Whether such teeth are more liable to caries or not is questionable. The work of Mrs. Mellanby, who lays so much stress on vitamin D and also on vitamin A, is well known. Against this, studies at Yale have led to the conclusion that there is no constant parallelism between rickets and subsequent susceptibility to caries. In cases of severe rickets in infancy, a greater incidence of caries is found, while in respect to the permanent teeth in 7 year old children, no significant difference in the incidence of caries in the hypoplastic and non-hypoplastic groups was observed.

Perhaps the animals that we have used experimentally are not the best suited for such work, as is suggested in the article by Cowgill.¹ Mrs. Mellanby was not able to produce caries in puppies regardless of their dental structure. Bunting, at Michigan, has found the same difficulty and has suggested that the conical shape of the dog's teeth plays a protective rôle. Many dentists hold that the relative resistance of the canines in man is due also to their shape. Bunting goes back to the idea, held for so many years and still believed in by many dentists, that the carbohydrate diet of man is responsible to a great extent for caries, and gives records of groups of children fed under his direction which are hard to explain otherwise.

Certain observers claim that the intake of extremely large amounts of vitamin D results in the development of caries. Their experiments were done on animals fed a rachitogenic diet low in phosphorus, and the experiments of other observers contradict these results. Mrs. Mellanby feels sure that vitamin A has a marked effect in preserving the health of the gingival tissues and that by proper feeding, caries may be arrested and to a certain extent healed, though she admits that the mechanical movements of the mouth have something to do with the results.

On the other hand, Bloch believed that vitamin A is in no way related to the development of caries. It seems to have been definitely proved that in some species, vitamin C has something to do with the proper development of teeth. A shortage of this factor is evidenced by a derangement of the odontoblastic cells and failure of the newly formed dentine matrix to harden. Cowgill points out that the number of variables operating in nutritional investigations is very great and the planning of a nutritional experiment along these lines is difficult. Consequently, it is not surprising that no one is able to make precise statements concerning the relation of the dietary factors involved in the maintenance of healthy teeth. He suggests that experiments on monkeys and apes might give results which are more reliable, and calls attention to the fact that many laboratories now are using such animals quite extensively so that it may be easily possible to extend the observations along the lines of dental health.

While it is believed that everyone who has studied the question recognizes the many conflicts of opinion as well as experimental evidence, there are certain fundamentals about which we can speak surely. We should recognize and give credit to the work of the dentists in calling the attention of the public to many of these matters, especially the necessity of correcting errors of occlusion, irregularities of teeth, and maintenance of cleanliness. As the dentist sees the majority of children early, often before they are carried to a physician, he is in a position to detect the

early signs of beginning systemic disease. Owing to this, there should be a much closer relation between physicians and dentists than now generally exists. For a long time dentistry was largely occupied in the mechanical factors of prosthesis. Without belittling the necessity of this work, it must be pointed out that it is often only a small part of the problem, and is often done more for esthetic purposes than for the prevention of systemic disease. It is interesting to note that this factor was operative as far back as the time of Solomon who complimented the Queen of Sheba as follows: "Thy teeth are like a flock of sheep that are even shorn, which come up from the washing." In the doggerel of today, the same idea has been expressed, "And teeth so white, you almost wish your ear she'd bite."

Preventive measures would call for a broadening of the scope of dental reparative work, such as is being carried out at present in some of our cities. At once we come in touch with a great social and economic question; namely, public health service.² We may then say positively that oral hygiene in general has a place, and a most important place, in the scheme of preventive medicine, and is worthy of the attention not only of physicians and dentists, but of health officers.

REFERENCES

1. Cowgill, George R. The Diet in Relation to Dental Problems, *Dental Cosmos*, Feb., 1934, p. 223.
2. Barker, L. F. On the Interests that Physicians and Dentists have in Common, *J. Dental Res.*, 13:105-115, 1933.

LETTER TO THE EDITOR

TO THE EDITOR:

PRECISION in the use of words, numbers or symbols is a characteristic of the exact sciences. The word "oxygen" means the same thing to scientists everywhere; the number "one" has a constant meaning for all mathematicians; and the symbol " H_2O " is interpreted as water uniformly and definitely by chemists throughout the world.

When we consider the so-called "social sciences" we find no such universal dictionary of definitions. Words do not have a common connotation. This leads to confusion, prolific explanations and oftentimes to misunderstandings.

In the field of public health, outside of the use of legal, medical, and engineering terms, confusion is worse confounded. The legal profession can turn to *Black's Law Dictionary*; the medical profession, to *Dorland's* and *Stedman's*

Medical Dictionaries; and the engineers, to the *Engineering Index*. If public health is to attain a position as a science there is need for a "Dictionary of Public Health."

Abundant illustrations which serve to point this need can be brought forward. It is a commonplace in current public health discussion to find "doctor" used interchangeably with "physician." Custom, traceable to earlier conditions in society when the professions were limited, sanctioned "Reverend" as the hall-mark in the ministry; "professor," in education; "doctor," in medicine. With the rapid diffusion of higher education, particularly in the United States, there has come an immense proliferation of degrees until today the earlier marks of the professions have become so jumbled as to be well-nigh meaningless.

As a matter of fact, the word "doctor" nowhere appears in a medical

dictionary—but there does appear the abbreviation “M.D.,” or doctor of medicine.

Again, in the current issue of *Public Health Reports*¹ in which appears a directory of whole-time county health officers for 1933, such officers are designated by law as follows:

Alabama—County Health Officer; Arizona — Director; Connecticut — Superintendent of Health; Georgia—Commissioner of Health; Massachusetts —Director of Public Health; Medical Director; and County Health Officer; Michigan—District Health Officer; Pennsylvania—County Medical Director; and Virginia—just plain health officer. Is it any wonder the poor layman stumbles and is confused when he seeks for the term with which to describe the administrative official charged with the public responsibility of protecting the health of the community?

One further example will suffice. In the recent issue of the volume *Community Health Organization*,² the current hesitation in the selection of the term to describe public health activities carried on outside of the official field, one will find the following words used interchangeably within the space of 10 pages — private — voluntary — unofficial—non-official.

That there is need for exactness of expression has been demonstrated from time to time. The *American Journal of*

Public Health has listed occasionally in its pages words and phrases employed in public health work, with their definitions. Since public health is a composite discipline drawing its materials from medicine, engineering, law, statistics, nursing, education, social science, and administration, it would seem that some effort should be made to compile a dictionary for the benefit of the workers in the public health field.

If mass education of the public in health matters is to proceed apace, certainly the public health workers themselves should be able to employ their tools with a minimum of hesitation and obfuscation. It is true, such a task would be time-consuming, expensive, and difficult, but until it has been undertaken public health will continue its stumbling and halting progress toward its goal as a science.

Dr. Oliver Wendell Holmes was not far wrong when he said “Science is the topography of ignorance,” and equally well could have said there is need of topographers in science. Particularly is this true in the area of public health.

ROBERT G. PATERSON, PH.D.,
Executive Secretary,
Ohio Public Health Association

1. *Pub. Health Rep.*, 48, 28:818-826 (July 14), 1933.

2. *Community Health Organization*. Edited by Professor Ira V. Hiscock, A.P.H.A., 1932.

LETTER FROM GREAT BRITAIN

THE OVERSHADOWING SLUM

At the end of 1933, as for a considerable time before, in public health circles here the main pre-occupation of the authorities and their officers appeared to be housing. For months the Minister of Health had been engaged in visiting various parts of the country, seeing for himself how matters stood,

and urging, encouraging, and threatening the persons responsible in areas in which arrangements for assisting forward his 5-year plan of slum clearance were hanging fire or had not been put in hand. Speaking generally, in most districts it is almost true to say that apart from housing activities, and largely because of them, little more than

the ordinary routine work received attention during the year.

Fortunately, there has been no marked prevalence of any particular disease for some time, and, so far as death rates show, the infant welfare and tuberculosis schemes are functioning satisfactorily. Exactly the amount of faith that should be reposed in death rates as a guide is always difficult to decide. Even in this matter of slum clearance, death and to an extent also disease rates frequently fail to lend support to those who are pressing for removal, proving infinitely more useful to those who are backing the owners of the slums and objecting to schemes of clearance.

So again frequently is it in the case of persons transferred from slums and placed in what appear to be improved surroundings. In this connection I have referred already, I think, to the investigations of Dr. G. C. M. M'Gonigle, Medical Officer of Health of Stockton-on-Tees, who found that both the mortality and morbidity rates noted among re-housed individuals were higher than in those who remained in the slum area.

HOUSING, MORBIDITY AND MORTALITY

Dr. M'Gonigle's explanation of this difference was that the persons in the newer houses, having to pay more in rent had less to spend on food, and had less resistance therefore to offer to disease. This doctrine was one very readily accepted by quite a number of people, particularly those who have been responsible for the raising of the barriers to progress in slum clearance.

The determination not to permit these barriers to remain, or such considerations as were put forward by Dr. M'Gonigle to strengthen them, culminated in the initiation of the drive which has been one of the outstanding features of 1933.

Who exactly has been responsible for

it is quite difficult to make out. Definitely there must have been some special impulse, and there is strong reason to believe that it came from the Royal Family. That the King and Queen are and have been gravely concerned is, of course, well known, and the Prince of Wales has spoken very freely on the subject on numberless occasions and in a variety of places.

Sir Hilton Young, who himself carries the fiery torch, speaking at the dinner of the Society of Medical Officers of Health in November, claimed that the medical officers of health were the spear-head of the attack. It is undoubtedly the case that these officers have very heavy responsibilities in this matter. These they have never neglected. Nor have they neglected to condemn the slum, to deplore the conditions under which so many of the people for and among whom they worked were compelled to exist, and to urge that action should be taken.

Practically there is no medical officer of health who has not directed attention, not once but many times, to the existence of slum conditions, recorded his opinion that these conditions were inimical to health, and urged that they should be dealt with. In doing so he has defied statistics, and on such occasions as the call for action has been heard and procedure for securing clearance has been taken, has had to suffer for his temerity at the hands of counsel and witnesses engaged by those opposed to action.

UNEMPLOYMENT AND THE

PUBLIC HEALTH

Another connection in which death and disease rates and such-like statistical manifestations appear to certain people to fail to provide evidence supporting that gathered by the senses affects infants. Here and there, in several places, there are medical officers of health and others who—while prepared

to agree that the infantile mortality rate, not only for the country as a whole but in the bulk of areas, keeps low and that it is permissible to accept this as indicating that unemployment is not exerting an influence inimical to the young—are not completely convinced that all is so well as we are asked to believe.

There are quite a number of areas in which the rates are tending to rise; in which wasting and marasmic conditions and such things as enteritis are more prominently present than has been the case for some years. There are, too, many reports from health visitors and voluntary workers at welfare clinics and in the homes of the people that very many more families are showing signs of strain than was formerly the case. Adult members of families, it is claimed, have been sacrificing themselves for a long time in order that the younger ones shall not suffer, and are now beginning to show signs.

In matters of this sort it is easy, of course, to attach exaggerated importance to cases that actually are isolated. It is a fact, however, that in most health departments the health workers who are out and about among the people have reports of this kind to make, and, as a result, that glow of satisfaction that the growing feeling of optimism should bring is less rosy than perhaps it should be.

THE EXPECTED MEASLES EPIDEMIC IN LONDON

By many of our forecasters it is promised that 1934 will prove to be a measles year. In the metropolis, at any rate, it is regarded as a certainty that it will reach epidemic proportions, and health officers and authorities are urged to make preparations accordingly. Largely these have reference to routine matters involving closer and more frequent supervision of school children, at

welfare centers and in the homes of the people.

Comparatively little in the shape of immunizing work has been done as yet in this country in respect of measles. It is possible, however, that if opportunity presents, much more may be done in London during the epidemic that is forecast for 1934–1935, a considerable amount of experience having been obtained in the last epidemic of 1931–1932, with results sufficiently encouraging to justify work on a wider scale.

In a report of the Medical Officer of Health of the London County Council dealing with the outbreak of 1931–1932, it is shown that special attention was devoted to the question of the employment of serum, more particularly human adult serum in the control of measles.

Adult Serum in Measles—The contribution on this subject to the report by Dr. Gunn, Deputy Medical Superintendent of the North Eastern Hospital of the London County Council, is of real value, as is also a statistical paper on the same question by W. T. Russell of the London School of Hygiene and Tropical Medicine.

The total number of observations recorded was 2,362. The adult serum series numbered 1,475, while there were 680 injections of convalescent serum, the uninjected contacts numbering 207. These numbers are, rightly, regarded as rather small when it comes to drawing conclusions on some of the finer points. Certain general conclusions, however, are sufficiently well based and may safely be drawn. Among these may be noted that as to the utility of adult serum in relation to prophylaxis. This provides support for the view that it is an agent of real value. The statement made, indeed, is to the effect that in its protective and attenuating action it is only slightly inferior to convalescent serum. Having regard to the fact that

it is so very much more readily obtained than the convalescent serum, and its collection, storage, etc., present comparatively little difficulty, it is likely to occupy a prominent place in any future policy of measles control. The report gives very detailed and clear information on these matters likely to prove useful to authorities and officers

desirous of including adult serum as part of their armamentarium against a disease which, though the public refuse to appreciate it, constitutes one of the most serious and difficult of the epidemiological problems with which preventive medicine is faced.

CHARLES PORTER, M.D.

London

ASSOCIATION NEWS

NEW MEMBERS

The following list includes applicants who have been approved for membership in the A.P.H.A. by the Sub-Committee on Eligibility. These new members have requested affiliation with the sections indicated, and action by the Section Councils will follow.

Health Officers Section

Herbert R. Edwards, M.D., New Haven Department of Health, City Hall, New Haven, Conn., Acting Health Officer
G. L. Rees, M.D., Smithfield, Utah, City Health Director
Ernest L. Stebbins, M.D., C.P.H., Henrico Health Dept., Richmond, Va., Director

Laboratory Section

William J. Alexsahlt, M.D., Gowanda State Hospital, Helmuth, N. Y., Pathologist, and Director of Laboratory
Russell Gottschall, Ph.D., 5050 Paddock Rd., Cincinnati, O., Assistant Bacteriologist, Wm. S. Merrell Co.
Thomas S. Hosty, M.A., 921 W. Woolman, Butte, Mont. (Assoc.)
Attracta F. Murray, B.A., 47 Prospect St., Waterbury, Conn., City Bacteriologist
Abraham M. Schaefer, M.D., 650 Main St., Hartford, Conn., Pathologist, Mt. Sinai Hospital
H. R. Thornton, Ph.D., University of Alberta, Edmonton, Alta., Canada, Professor of Dairying

Vital Statistics Section

Marian C. Holland, 647 Sinaloa Ave., Pasadena, Calif., Deputy Registrar, Vital Statistics Division

Public Health Engineering Section

James L. Barron, C.E., 20 N. Broadway, White Plains, N. Y., Director, Division of

Sanitation, Westchester County Department of Health

Oral W. Fowler, 491 Second Ave., Yuma, Ariz., Sanitation and Dairy Control Work, City Health Department

W. H. Larkin, C.E., 2 E. Main St., Middletown, N. Y., District Sanitary Engineer, State Department of Health

James H. Le Van, C.E., Suite 816, New Post Office Bldg., Chicago, Ill., Assistant Sanitary Engineer, Regular Corps, U. S. Public Health Service

Frederick C. Roberts, Jr., S.B., State Board of Health, Phoenix, Ariz., Sanitary Engineer

Fred E. Smith, M.S., 38 Linnaean St., Cambridge, Mass., Chemist, City Water Department

Fred H. Stutz, City Health Department, Coral Gables, Fla., Director, Bureau of Inspection

Ralph B. Wiley, B.S., 777 Russell St., W. Lafayette, Ind., Professor of Sanitary Engineering, Purdue University

Industrial Hygiene Section

Joseph E. Burns, M.D., 946 Main St., Buffalo, N. Y., Attending Physician, Jacob Dold Packing Company

Child Hygiene Section

Dorothy E. Loope, R.N., Ft. Thompson, S. D., U.S.I.S., Field Nurse

Velma V. Spaulding, Ph.D., Denver Tuberculosis Society, Denver, Colo., Executive Secretary

Public Health Education Section

H. Shirley Dwyer, D.D.S., 62 Hanson Place,
Brooklyn, N. Y., Supervising Dentist, City
Health Department

J. J. Guenther, M.A., 4509 Seward St.,
Omaha, Nebr., Lecturer in Public Health,
Nebraska M. E. Hospital

Emma Lambert, R.N., Hydaburg, Alaska,
Public Health Nurse

George J. Wherrett, M.D., 306 Plaza Bldg.,
Ottawa, Ont., Canada, Executive Secretary,
Canadian Tuberculosis Association

Public Health Nursing Section

Gertrude Dorsey, R.N., 222 E. Fourth, Se-
dalia, Mo., Visiting Nurse, Metropolitan
Life Insurance Company

Lillian Johnston, 23 Gedney Terrace, White
Plains, N. Y., Public Health Nurse, West-
chester County Department of Health

Louise Knapp, M.A., 509 W. 121 St., New
York, N. Y., Instructor, Public Health
Nursing, Dept. of Nursing Education,
Teachers College, Columbia University

Ruth M. Mountjoy, R.N., 1501 W. Yakima
Ave., Yakima, Wash., Assistant City Visiting
Nurse

Mildred T. Sanderson, Rm. 35, Mun. Courts
Bldg., St. Louis, Mo., Superintendent,
Municipal Visiting Nurses

Epidemiology Section

Henry E. Meloney, M.D., Vanderbilt Uni-
versity School of Medicine, Nashville, Tenn.,
Associate Professor of Preventive Medicine
and Public Health

James E. Perkins, M.D., Dr.P.H., C.P.H.,
State Department of Health, Albany, N. Y.,
Epidemiologist

Unaffiliated

Col. Roy W. Gausmann, Societe des Eaux,
America St. No. 2, Athens, Greece, General
Manager, Water Company (Assoc.)

William W. T. Squire, State Office Bldg.,
Hartford, Conn., Secretary, charge of Bu-
reau of Adult Welfare

MRS. FRAAS APPOINTED TO NEW
POSITION

Mrs. Alma W. Fraas, Secretary of the
Committee on Administrative Practice,
has left the Association to become Sec-
retary to the Commissioner of Health of
New York City, Dr. John L. Rice.
She was formerly a member of the Re-
search Division of the American Child
Health Association and for the past
several years has been Secretary of the
Committee on Administrative Practice.

PUBLIC HEALTH ADMINISTRATION

THE FAMILY PHYSICIAN AND DENTIST IN PREVENTIVE MEDICINE

GEORGE B. DARLING, JR., DR.P.H.

W. K. Kellogg Foundation, Battle Creek, Mich.

INCLUDED in the summary of findings and conclusions of the committee which studied city health organizations for the White House Conference on Child Health and Protection, there appeared the following:

Some activities now included in the program of most health departments can be transferred gradually to the general practitioner of medicine. In the interest of child health, in so far as practical, the family physician should become a practitioner of preventive as well as curative medicine. He should take an interest in seeing that his clients are protected against smallpox, typhoid fever, and diphtheria, and that adequate periodic physical examinations are made. The public health service should stimulate interest in extending postgraduate instruction to the general practitioner of medicine to interest him in this type of service, and also to establish reasonably uniform methods of procedure.

There is a growing tendency to improve the coöperative relationship between local health organizations, both official and voluntary, and the medical and dental professions. In the expansion of such services, it should be understood that there is no place in such plans of professional participation in health work for the elimination or even the curtailment of the work of the official local health department. On the contrary, the first essential of such an enterprise should be the establishment of a whole-time, properly personneled and reasonably financed, local health department. Such a recommendation was unanimously approved by the delegates to the last annual meeting of the

Michigan State Medical Society and this state organization is now engaged in a plan for extending such coöperative services to every county in Michigan.

Noteworthy progress has been made during the past 20 years in reducing death rates and in minimizing the prevalence of such communicable diseases as typhoid fever, smallpox, and diphtheria. Nineteen hundred and thirty-three will be remembered throughout the nation as a year of low death rates, one with new, low, all-time records for many infectious diseases. Apparently we have been carried forward by the momentum of previous years, as a direct result of the seeds of health education which were so effectively sown during the more prosperous times. The public mind has been aroused to the necessity of community effort in the furtherance of public health services. While there may be momentary lapses in the health programs and temporary curtailments of adequate support for health problems, there can never occur a reversion to the high mortality of 20 years ago. Our people are demanding protection for themselves and for their children. The local health machinery must be maintained in good working order. The health officers must use their ingenuity in finding the means with which to carry them through the period of stress and strain.

In general the medical aspects of the local health program can be provided

in either one of two ways: first, by the employment of physicians and dentists on a salary basis; or second, by bringing into active coöperation the existing professional resources of the local community so that the doctors and dentists will practise preventive medicine along with curative medicine in their own offices. The fulfillment of this last mentioned program requires the hearty coöperation of the health officer who must act as a stimulating agent in forcibly bringing to the attention of the public the need of such preventive services and in coördinating the activities of the various professional groups.

The progress in this direction is well illustrated in the annual report of the Barry County Health Department just released by the Health Officer, Dr. M. R. Kinde. Barry is a typical rural county located in the southwestern part of the State of Michigan. The only city is Hastings with a population of 5,227. There are four incorporated villages. The county has a population of 20,928, of whom 96 per cent are native white. The county contains 560 square miles and has an efficient County Health Department consisting, in addition to the Health Officer, of a sanitary engineer, a public health nurse, and a clerk. The W. K. Kellogg Foundation has also assigned to this county 4 public health nurses all of whom are qualified graduate teachers. Certain additional services are from time to time provided by the Foundation.

In this rural area the physicians and dentists have organized themselves so that they have become an important part of the health machinery of the community. The Health Department serves as a coördinating body; the Health Officer himself serves as secretary of the County Medical Society and acts in an administrative capacity in formulating the services and in organizing the work which is carried on

by the physicians and dentists so far as possible in their own offices.

At the beginning of the year 1933 it was determined that every school child in both the rural and urban schools should receive a health examination at the hands of the practising physicians working under a plan controlled jointly by their local medical society and the Health Department. Each physician has taken his turn in giving the screening examination to the children at school. The dentists have organized a similar program. Following such service, the more thorough and detailed examinations, and the corrective services are provided by the professional men in their own offices where not only the school children, but the children of preschool age receive their diphtheria protection and are vaccinated for smallpox. An intensive educational program to encourage the coöperation of the parents has been sponsored by the County Commissioner of Education and promulgated through the medium of the school teachers and with the coöperation of the public health and teacher nurses.

The principle of the entire program is to bring the child in closer relationship with the family physician. The Health Officer states that it has long been realized that preventive and curative medicine cannot be separated and both are functions of the family physician.

An additional essential of such a program of professional coöperation is the necessity to prepare the profession, first, with respect to the group plan which should be under the control or supervision of the local medical society and health department, and second, with regard to the technical procedures to be followed. The physician in private practice should be willing to subordinate his views and plans to those sponsored by the organized profession. Failure to do so would result in mis-

interpretation on the part of the public. In the carrying out of diphtheria protection services each physician must be conversant with the accepted practices; he must know whether toxin-antitoxin or toxoid is to be used; he must have a knowledge of the reactions which may be expected in children at various ages; he must know the length of time for which protection is usually given; and he must be prepared with answers for the numerous inquiries which will occur to the public mind.

To provide postgraduate work for the physicians and dentists of Barry County, the W. K. Kellogg Foundation established a series of postgraduate fellowships not only for Barry County but for the neighboring counties of Allegan and Eaton. Of 72 physicians

resident in these rural areas, 56 have already completed their first course in postgraduate training, and of 34 dentists, 28 have had the advantage of similar training. These fellowships provided for a 2-week intensive course and most of the physicians and dentists received this training at recognized professional centers in Chicago. In addition, men of professional ability have presented special subjects in the field of preventive medicine to the physicians at their own county meetings.

Experience thus far indicates that it is perfectly practical under rural conditions to carry on a coöperative health program where a well organized local health department works harmoniously with the local dentists and physicians.

Commonwealth Fund, New York City—For more than 10 years the Fund has entered into partnership with local health and hospital organizations with the view of extending the responsibility for maintaining new services or standards of health work, in so far as possible, through local financial support. The stressing of local participation in financing health and welfare projects is one of the basic principles on which the Fund has constructed its activities.

During the fiscal year ended September 30, 1933, the Commonwealth Fund expended more than \$1,600,000, nearly half of which (46 per cent) went into the field of health. The program has involved rural health service, rural hospital service, medical education, and medical research. It has now been 5 years since the Fund withdrew its support for the health demonstration in Fargo, N. D., and the community has since maintained its own public health program. The health department has been accepted as one of the essential normal divisions of the local government. The character of performance

has not suffered during the past 5 years as evidenced by the fact that in 1932 Fargo scored 845 points on the *Appraisal Form*. Like most American communities, economies have of necessity been made in the health service but last summer when further cuts were considered a group of citizens complained so rigorously that the city commission refused to make any further cuts in the health department appropriations. In addition to the Health Officer, the staff consists of 6 nurses and a supervisor, a milk inspector, a half-time dentist and 2 clerks. The only loss suffered due to the depression has been a second inspector and a part-time medical assistant.

During the fiscal year the Fund has continued to support health activities in Massachusetts, Mississippi, and Tennessee. In spite of the loss of nearly 50 per cent in its appropriations, the Tennessee State Health Department has maintained its excellent standards, and in 4 counties in Tennessee and Mississippi, where the Fund has aided in the maintenance of health service, the

appropriations have been definitely increased. In Lauderdale and Pike Counties, Miss., the health departments are employing private physicians as clinicians in various fields of public health service. This is considered an alternative to adding medical assistants to the health department staff, which is the preferred plan in Tennessee. In all of the 6 local coöperative enterprises in 3 states, the application of the *Appraisal Form* as a measuring stick indicates a higher score for 1932 than that attained in the preceding years.

The Commonwealth Fund has continued its support of the activities of the Committee on Administrative Practice of the American Public Health Association, and has published for the committee a review of rural public health service by Dr. Allen W. Freeman.—*Ann. Rep., Commonwealth Fund, 1933.*

Washington, D. C.—The annual report for the year ending June 30, 1933, is published with the general report of the government of the District of Columbia and contains the vital statistics for the calendar year 1932, when the death rate in this city of 493,000 was 16.12, slightly higher than that for each of the three preceding years. During the calendar year 1932, there were reported 401 cases of diphtheria, of which 16 resulted in death; 814 cases of scarlet fever with 13 deaths. Diphtheria protection service has been provided through the schools and through the child hygiene centers. The health officer is not satisfied with the extent of this immunization service, there having been 7,642 children given the Schick test during the fiscal year, of which number 4,682 gave a positive reaction and to 4,510 of whom toxoid was administered.

Typhoid fever was the cause of 6 deaths among 67 reported cases. This

may be compared with 64 cases and 19 deaths for the preceding year. Of the 67 cases reported in 1932, a history of outside infection was found in 23 instances. Epidemiological studies disclosed evidence that indicates 15 per cent of the typhoid cases were due to eating raw oysters, 13 per cent to the consumption of ice cream, and 61 per cent to raw vegetables. The infant mortality rate in 1932 was 73.6 per 1,000 births.—*Rep. Government of the District of Columbia, year ended June 30, 1933.*

Maryland—The death rate from all causes in 1932 was 12.6 per 1,000 population; the infant mortality rate 69.5 and the maternal rate 5.0 per 1,000 live births. By the end of the year 22 of the 23 counties in Maryland representing 98 per cent of the total population outside of the City of Baltimore, were organized on a full-time basis. Beginning with Allegany County in 1922 the whole-time local rural health services have gradually been expanded until now virtually the entire state has been covered. Each full-time county health officer also serves as a deputy state health officer.

For the entire state there were reported 695 cases of typhoid fever, with a death rate of 3.1. Of this number 593 cases were reported from the counties; 46 ended fatally. For Baltimore there were reported 102 cases with 6 deaths. Diphtheria claimed the same total number of victims. Of the 52 deaths, 17 occurred in Baltimore and 27 in the counties. The diphtheria prevention activities have been concentrated on the protection of younger children, 14,050 of whom were immunized against the disease during the year. There were reported 49 cases of Undulant Fever and 26 cases of Tularemia.—*Ann. Rep. for 1932, State Department of Health.*

LABORATORY

THE EFFECT OF AGE, DILUTION, AND DOSAGE UPON THE IMMUNIZING VALUE OF DIPHTHERIA TOXOID

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IN a previous paper¹ we had reported finding considerable variation in the antigenic value of commercial diphtheria toxoids as determined by the Ramon flocculation test, by guinea pig protection tests, and by human experimentation. Greengard² found a variability in antigenic potency of several batches of commercial diphtheria toxoids as determined by immunization of infants. Povitzky,³ in examining toxoids from different manufacturers by means of the flocculation test, found a wide variation in their antigenic values. Of the five toxoids tested by us, three had been diluted, two in a ratio of 1 to 1, and one in a ratio of 1 to 3. The highest immunity had been obtained with an undiluted toxoid. It seemed probable that dilution was one of the factors affecting the potency of toxoid. Whether or not the age of the toxoid had any appreciable effect on its antigenic value was deemed worthy of consideration and study, particularly since

federal regulations allow an expiration time of 18 months on this product. The question of dosage was also considered of sufficient importance for further investigation. To determine, therefore, the effect of dilution, age, and dosage upon the immunization value of diphtheria toxoid, a series of tests was carried out, the results of which are presented in this paper.

A preliminary Schick test was given to 1,016 children between the ages of 1 and 15 years, 84 per cent of whom were in the 4 to 10 year age group. None of these children, so far as could be determined, had had diphtheria or had been immunized against it. The results are given in Table I.

Through the kindness of the Cutter Laboratory a supply of diphtheria toxoid and toxin was made available to us. Toxoid lot No. 9163 was prepared in April, 1932. This toxoid was divided into two portions early in June, 1932. One portion was left undiluted

TABLE I
RESULTS OF PRELIMINARY SCHICK TEST

Age Group	Total No. Tested	Schick Positive	Per Cent Non-Immune
1-3	55	51	92.7
4-5	124	111	89.5
6-10	726	626	86.2
11-15	111	86	77.5
Total	1,016	874	86.0

TABLE II
FLOCCULATION VALUES OF TOXOID LOT NO. 9163

<i>Toxoid</i>	<i>Date Tested</i>	<i>Lf</i>	<i>Units per c.c.</i>
	1932		
Undiluted	April 18	0.086	11.63
Undiluted	May 5	0.076	13.16
Undiluted	Nov. 22	0.076	13.16
Old Diluted	Nov. 22	0.152	6.58
Freshly Diluted	Nov. 22	0.138	7.25

and the other was diluted with an equal amount of salt solution and preservative. This diluted toxoid we shall speak of as the "old diluted toxoid." Another portion, the "freshly diluted toxoid," was later prepared from the original lot of toxoid, a dilution of 1 to 1 being made about a week prior to the first injection. Immunization of the children was begun in the latter part of November, 1932, and was carried on through February, 1933. Schick positive reactors only were given the toxoid immunization. Those that gave a combined (protein) reaction were excluded.

The flocculation values of the different toxoid portions were determined by Dr. Harry E. Foster of the Cutter Laboratory. The Lf value of the stock undiluted toxoid was 0.086 in April, 1932. Tests on all portions were carried out in November, 1932, 7 months after the original lot of toxoid had been made, and immediately after the freshly diluted portion had been prepared. His figures are given in Table II.

In commenting upon these values Dr. Foster states:

Judging from the figures alone there would appear to be a discrepancy in these tests, since theoretically the specially (freshly) diluted material could not have a value better than 0.152. Practically, however, there is sometimes difficulty in telling which of the two adjacent tubes first shows flocculation and it is quite possible that in the test on undiluted toxoid the tube containing 0.076 and that containing 0.068 came down approximately together.

Anderson, Leonard, and Holm⁴ are of the opinion that the flocculation reaction

is not always specific, and, therefore, is not always a true measure of the antigenic value. They state further that the flocculation time is not always a true measure of avidity, as determined by flocculation. In our previously reported work¹ we showed that the guinea pig protection test gave a truer index of potency than the flocculation test.

Guinea pig protection tests were carried out on the undiluted and the old diluted portions of the toxoid. Unfortunately, guinea pigs of the size used in the protection test, 280 to 300 gm., were unavailable to include tests on the freshly diluted toxoid. Five guinea pigs were injected subcutaneously with 1 c.c. of the old diluted toxoid; 5 with 0.5 c.c. of undiluted toxoid; and 5 with 1 c.c. of undiluted toxoid. Four of the animals were subsequently lost because of death from septicemia. Six weeks later the survivors were given varying amounts of diphtheria toxin. The results are shown in Table III.

A study of Table III indicates that the undiluted toxoid gave greater protection than the equivalent amount of diluted old toxoid. Because of the few animals used no conclusions could be drawn as to the superiority of the 1 c.c. dose over the 0.5 c.c. dose of undiluted toxoid.

A total of 766 children were given the toxoid. They were divided into four groups. One group was given undiluted toxoid in two 0.5 c.c. doses at an interval of 3 weeks. A second group was given three 0.5 c.c. doses undiluted toxoid at

TABLE III

GUINEA PIG PROTECTION TESTS WITH OLD DILUTED AND UNDILUTED TOXOID, No. 9163

Diphtheria Toxin in M.L.D. Doses

Toxoid No. 9163	Size Dose	Floc. Units Injected	5		10		20		40	
			Guinea Pigs Inj.	Surv.	Guinea Pigs Inj.	Surv.	Guinea Pigs Inj.	Surv.	Guinea Pigs Inj.	Surv.
Old Diluted	1 c.c.	6.6	2	1	2	0	..	..	..	..
Undiluted	0.5 c.c.	6.6	1	1	1	1	1	0	..	..
Undiluted	1 c.c.	13.2	1	1	1	1	1	0	1	1

intervals of 1 week. A third group was given two 1 c.c. doses of the old diluted toxoid at an interval of 3 weeks. The fourth group was given two 1 c.c. doses of the freshly prepared diluted toxoid at an interval of 3 weeks. All groups were re-Schicked 3 months after the final toxoid injection.

Of the 766 children given the toxoid, 620, or 81 per cent completed the various courses of injections and were available for the final Schick test. It is rather a coincidence that exactly the same percentage of children available for the final Schick test was obtained in our previously reported work on toxoid immunization.

The diluted toxoid apparently loses potency upon aging since the freshly diluted toxoid gave over 5 per cent more immunes than the old diluted toxoid. It is probable that had the immunization tests been carried out at the expiration date of the toxoid—a good year later—a more striking difference between the old and fresh toxoids might have been obtained. The results obtained with the guinea pig protection tests also strengthen our belief that diluted toxoid loses potency upon aging,

and that if diluted toxoid is to be used at all, a shorter expiration time should be required.

The question of dosage has been given considerable study and investigation by many workers. In our previously reported work we obtained from 82 to 100 per cent immunes when two doses of 1 c.c. each were given at a 3-week interval. The highest percentage immunes obtained in our present series, 98 per cent, resulted from three 0.5 c.c. doses given at weekly intervals. Advocates of the alum precipitated toxoid claim a 95 or higher percentage immunes with a single dose. It is a well known fact that repeated injections of an antigen increases the immune bodies in the reacting animal or human. Such increases are usually not proportional to the amount of antigen injected. There is evidence that a definite quantity of toxoid given in divided doses will give more protection than if given in a single dose. Park and Schroder⁵ showed that a single dose of $\frac{1}{4}$ c.c. toxoid will protect a guinea pig against 10 m.l.d. toxin; whereas, if given in two doses of $\frac{1}{8}$ c.c. at an interval of 1 week, 20 m.l.d. will be overcome; and if given in three doses

TABLE IV

IMMUNIZING VALUE OF OLD DILUTED, FRESHLY DILUTED, AND UNDILUTED DIPHTHERIA TOXOID

Toxoid No. 9163	Size Dose	No. Doses	Total Floc. Units	Interval between Doses	No. of Children Injected	No. of Children Negative on Re-Schick	Per cent Children Immunized
Old Diluted	1 c.c.	2	13.2	3 weeks	153	135	88.2
Freshly Diluted	1 c.c.	2	14.5	3 weeks	168	157	93.5
Undiluted	0.5 c.c.	2	13.2	3 weeks	161	145	90.1
Undiluted	0.5 c.c.	3	19.7	1 week	138	135	97.8

of 1/16 c.c. with intervals of 1 week, 40 m.l.d. will be overcome. Povitzky³ also demonstrated that the degree of immunity is enhanced if a stated quantity of toxoid is given in divided rather than in a single dose. For these reasons we are of the opinion that the number of doses rather than the number of flocculation units influences the percentage of immunes obtained with any given toxoid.

A small number of children were re-Schicked who, through illness or for other reasons, had been unable to complete the full course of injections. Twenty-two children were given one injection of the old diluted toxoid; 7, or 31 per cent, were negative on the re-Schick. Six children given one injection of the freshly diluted toxoid were still positive on the re-Schick. Of 5 children given only one injection of undiluted toxoid, 3, or 60 per cent, became Schick negative. Of 10 children given two injections of the undiluted toxoid at a weekly interval, 9, or 90 per cent, were negative on the re-Schick.

The inference of Massey⁶ that rural children do not react to the Ramon toxoid to the same degree of immunization as do urban children was not corroborated by our findings. Of the 620 children given the toxoid injections 180 were from distinctly rural communities. The results obtained on these rural children are indicated in Table V.

Ninety per cent of the rural children were immunized with the toxoid, whereas, 93 per cent of the urban children were so immunized. These figures certainly confirm Dr. Park's findings of 90 to 98 per cent immunes in young children who receive two doses of Ramon toxoid. The low percentage of immunes obtained by Massey—61 per cent—might probably be explained by the use of a toxoid low in immunizing value. Occasionally even the Schick toxin may not be as strong as or even stronger than the label indicates. Several years ago, one of us (W.L.) on checking a commercial diphtheria toxin used for the Schick test found it to be exactly four times as strong as the label indicated.

CONCLUSIONS

Diphtheria toxoid may be expected to give a high percentage of immunes if it be of high antigenic value as determined by the guinea pig protection test. Of 620 Schick positive children given toxoid, 572, or 92.2 per cent, were found to be Schick negative 3 months after the last injection. Rural children reacted equally well as the urban children. Toxoid which has been diluted loses some of its potency upon aging, and the expiration time of 18 months allowed by the federal government is too long. Undiluted is preferable to diluted toxoid. Three 0.5 c.c. injections of un-

TABLE V

INCIDENCE OF DIPHTHERIA SUSCEPTIBLES AMONG RURAL CHILDREN AND PERCENTAGE IMMUNIZED BY RAMON TOXOID

<i>Preliminary Schick Test</i>				<i>Immunization with Toxoid No. 9163</i>			
<i>Age Group</i>	<i>No. Tested</i>	<i>Schick Positive</i>	<i>Per cent Non-immune</i>	<i>Toxoid</i>	<i>No. Inj.</i>	<i>No. Negative on Re-Schick</i>	<i>Per cent Immunized</i>
4-5	16	15	93.7	Old Diluted	46	40	87
6-10	202	163	80.7	Freshly Diluted	43	40	93
11-15	80	56	70.0	Undiluted (2 doses)	58	50	86
				Undiluted (3 doses)	33	32	97
Total	298	234	80.0	Total	180	162	90

diluted toxoid at weekly intervals gave 98 per cent immunes. For the physician who sees the child in his office this three-dose course should be the one of choice if the Ramon toxoid is to be used. Practically no reactions are obtained with this size dose. On the other hand, where the health officer and physician have to give the injections in the field, two doses of 0.5 c.c. and 1.0 c.c. undiluted toxoid or two doses of 1 c.c. of freshly diluted (1 to 1) toxoid, given at a 3-week interval may be recommended. With a potent toxoid, either with the two or three dose injection, at least 90

per cent immunes may confidently be expected.

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RESOLUTION ADOPTED BY THE RESEARCH COMMITTEE OF THE INTERNATIONAL ASSOCIATION OF ICE CREAM MANUFACTURERS, AT ITS MEETING IN CHICAGO ON SEPTEMBER 18, 1933

WHILE this committee fully realizes the importance of research in the matter of determining the bacterial count in dairy products, it deplores the fact that at times the results of such research are made standard practice, thereby resulting in different agencies using different methods. This committee wishes to go on record as strongly recommending that all agencies having to do with determining the bacteria count in dairy products adhere to the published American Public Health Association methods. The committee feels certain that the proper committee of the American Public Health Association will at all times be glad to entertain the results of research pointing toward the need of a change in their published methods.

Dr. Robert S. Breed, Chairman, Committee on Standard Methods for the Examination of Dairy Products, comments, in a letter to the Executive Secretary of the A.P.H.A., as follows:

Dear Doctor Emerson:

Thanks for your courtesy in transmitting the copy of the resolution

adopted by the International Association of Ice Cream Manufacturers in Chicago, September 18, 1933. As Chairman of the newly organized Committee on Standard Methods for the Examination of Dairy Products of the American Public Health Association, I wish to emphasize the suggestion contained in this resolution that all laboratories following procedures in analyzing dairy products that they regard as superior to those outlined in the new (sixth edition) of *Standard Methods of Milk Analysis* (in press), transmit a description of these improved procedures to the undersigned. Such suggestions will receive careful consideration by the committee. It is only through the helpful coöperation of interested laboratory workers that this report is kept up to date.

If, on the other hand, laboratories find that they are following out of date recommendations, it is suggested that these procedures be brought into harmony with standard procedures as quickly as possible. Even where laboratories follow standard procedures closely, there are still enough discrepancies in counts obtained from duplicate

samples of milk and cream sent to different laboratories to give continued support to those interests that try to undermine confidence in bacterial counts by attacking their accuracy.

Plans are already under way for making an extensive comparative test of the suggestions that have been made that the standard incubation temperature be reduced from 37°C. to 32°C.; and that the composition of the agar be changed

to one more suited to growing all types of bacteria known to occur in market milk and ice cream. It is hoped that agreement can be reached in regard to these matters before the next edition of the *Standard Methods of Milk Analysis* is prepared.

ROBERT S. BREED

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VITAL STATISTICS

The Incidence of Venereal Disease in the United States—If the incidence of venereal disease can be reduced by adequate sex education, a large proportion of our population would be protected against a very important cause of mental deterioration. According to Vedder, 20 per cent of the young adult males of the population of the class from which the army was recruited are infected with syphilis and 5 per cent of the young men in colleges. The syphilis rate for the country is generally represented as 4.77 for the males and 3.07 for the females, with the highest prevalence among young adults twenty to twenty-five years of age. What is more significant for the welfare of the people is that syphilis permeates all strata of our population. The statistics of the American Social Hygiene Association, based upon blood tests, show figures varying from 1.4 per cent for farmers to 3.2 per cent for merchants and tradesmen, 6.1 per cent for laborers, and 11.7 per cent for railroad employees as recorded at the Mayo Clinic. Stokes and Brehmer assert that 26 per cent of syphilitics become infected between the ages of seventeen and twenty years and 32 per cent between twenty and thirty-five years of age. According to the studies of Newsholme, 10 per cent of all admissions to the state hospitals for the insane are due to general paresis. If syphilis is present in the general population to the extent of 10 per cent, the potential hazards to rational mental function are severe. To state that each year the United States presents a minimum of 679,000 new cases of gonorrhea and 423,000 new cases of syphilis is a sharp challenge to the intelligence of communities that em-

ploy every effort to educate the public concerning diseases like rabies, tuberculosis, and typhoid fever. These diseases are relatively negligible in their effects upon somatic and psychic well-being compared with the absolute and relative ravages of the venereal diseases.—*Mental Hyg.* 18:45 (Jan.), 1934. (Taken from *Sex Education in Relation to Mental and Social Hygiene*, by Ira S. Wile, p. 40–50.)

Vital Statistics for Maryland—A provisional summary of vital statistics for the State of Maryland in 1933 shows that 27,633 births were reported in the state during that year, as compared with 28,740 in 1932. The birth rate decreased from 17.2 in 1932 to 16.3 in 1933, the lowest rate on record. There were 21,464 white births and 6,169 colored. Of the total 27,633 births about 11 per cent were attended by midwives.

The general death rate continued the uninterrupted downward trend which has characterized it since 1928. In 1932 the rate was 12.6 per 1,000 population, and in 1933 it was 12.2. The white population had a mortality rate of 11.3 and the colored a rate of 16.5. Almost 70 per cent of the deaths occurred among persons 45 years of age and over.

The infant mortality rate for Maryland for 1933 was 64.9 per 1,000 live births, as compared with 69.5 for 1932. The low rate for 1933 is noteworthy because it is considerably lower than Maryland's previous lowest rate which was the rate recorded in 1932. In 1933, 1,149 white infants died as compared with 644 colored, making the mortality rate for the white infants 53.5 and for

the colored, 104.4. It is interesting to note that more deaths occurred during the first month of life than in all the rest of the first year, and that congenital malformations and diseases of early infancy caused 53 per cent of all the infant mortality. Of the 23 counties in the state, Queen Anne's (with an infant mortality rate of 120.2), Worcester (110.8), and Somerset (108.9), had the highest infant mortality rates and Carroll (38.0), Baltimore (44.8), and Howard (45.1), the lowest. There were 135 puerperal deaths in 1933 as against 144 in 1932. The maternal mortality rate per 1,000 live births for this year was 4.4 for white mothers and 6.6 for colored.

Analysis of the individual causes of death in 1933 shows that typhoid fever (with a death rate of 2.2 per 100,000 population), diphtheria (1.7), and tuberculosis (80.6), had the lowest mortality rates ever recorded for these diseases in Maryland. There were decreases for 1933 over 1932 in the mortality from measles which declined from 1.1 to 0.2, whooping cough from 5.4 to 4.9, influenza from 20.1 to 17.2, diabetes from 25.7 to 23.6, diarrhea and enteritis under 2, from 19.6 to 16.7; and marked reductions in cerebral hemorrhage from 112.6 to 95.1, and pneumonia from 103.5 to 93.8. Heart disease showed a very slight decline from 256.5 in 1932 to 256.0 in 1933.

Scarlet fever was the only one of the infectious diseases listed in the preliminary report, which showed an increase in 1933 over 1932, the rates being 2.3 and 1.9 for the two years, respectively. Nephritis increased from 138.5 per 100,000 in 1932 to 144.4 in 1933, and automobile accidents from 24.2 in 1932 to 25.4 in 1933.

Heart disease, nephritis, cancer, and cerebral hemorrhage were the leading causes of death in the State in 1933, and together they caused 50 per cent

of the total mortality.—Maryland State Department of Health. Bureau of Vital Statistics (Jan. 15), 1934.

Statistics on Obstetric Operations in Hamburg, Germany—Statistics compiled by the public health service on obstetric operations performed in the city of Hamburg, Germany, reveal that in this city with a population of 1,100,000, a total of 5,391 births were completed with the aid of an operation, during the three years 1929–1931. Since, during that period there were 46,401 births (inclusive of stillbirths), there were 116.1 obstetric operations per thousand births. The figure 5,391 included 3,654 obstetric operations such as forceps delivery, version, extraction, embryotomy, perforation, induced premature birth and caesarean section, and also 1,737 cases with operative aid in such complications as hemorrhages, placenta praevia, eclampsia, and post-natal complications.

Compared with the prewar period, the number of births completed by operation shows a marked increase: for instance, during the period 1910–1911, a total of 3,488 obstetric operations were performed in Hamburg. These included the complications of the birth process but did not include aid given in hemorrhages, and represented 8.05 per cent of the total number of births. Aside from the birth complications, obstetric operations were performed in 2,854 cases, or in 6.50 per cent of the births.

The distribution of the obstetric operations has undergone a change as compared with the prewar period. Podalic version has declined to about half of its prewar frequency. Artificial induction of premature birth was not reported in 1929–1931 in a single instance. Embryotomy has increased from 2.1 per cent to 3.3 per cent. Caesarean section has increased to an even greater extent. During the period

1876-1880, caesarean section occurred only once in a thousand obstetric operations performed in Hamburg. In 1910-1911 the proportion increased to 13 per thousand; in 1929-1931 the proportion rose to 176 per thousand. For the most part, caesarean section was substituted for version. A period of fifty years has brought a 350 fold increase in the use of caesarean section. In the early history of the revived operation (for example, in 1881-1885), 75 per cent of the mothers succumbed to the operation; in 1910-1911, only 18.2 per cent; and the mortality has since decreased steadily.

The mortality of other obstetric operations has likewise declined, although not to the same extent. The percentage of stillbirths resulting from the use of forceps has changed the least (1910-1911, 6.0 per cent; 1929-1931, 5.1 per cent). With respect to version, the decline in mortality over this period has been something more than one-third

(from 38.5 per cent to 24.5 per cent); as regards extraction, a little more than one-fourth (from 20.9 per cent to 15.1 per cent). Taking obstetric operations as a whole, the danger of a stillbirth has declined from 18.0 per cent to 13.4 per cent, or about one-fourth, which has been brought about chiefly through the improvement in the technic of caesarean section.

The complications of labor have become more frequent: 1910-1911, 1.45 per cent; 1929-1931 (without hemorrhages), 1.97 per cent. Various complications make up the increase, but particularly eclampsia which increased from 0.09 per cent to 0.34 per cent.

With respect to stillbirths, in 1910-1911, 61.5 per cent of the babies were born dead in association with placenta praevia; in 1929-1930, only 19.4 per cent. In eclampsia, the infant mortality has declined from 25 per cent to 12 per cent.—*J.A.M.A.* 102:224-225 (Jan. 20), 1934.

PUBLIC HEALTH ENGINEERING

THE AIR WE BREATHE AND THE SOUNDS WE HEAR*

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THE importance of the air we breathe with respect to public health warrants the serious attention being given to it in any consideration of the public health engineering problems of large communities. A person may live for weeks without food, and for days without water, but he cannot live more than a few minutes without air. For this reason, a continuous supply of air is more important to life than a continuous supply of either food or water.

If we do not like the water or food at the place where we happen to be at the moment, we can wait for a reasonable period until some other source can be procured. But we do not enjoy this much latitude with respect to air. We have to breathe the air wherever we may be, and have no option in the matter.

A due recognition of these facts has led to a tremendous development of air conditioning apparatus in recent years. Devices for efficient and controlled heating, cooling, humidifying, and dehumidifying, as well as the removal of dust and other air impurities are now available for all types of buildings. This last summer a considerable amount of prominence was given to air filters for private homes for the prevention and relief of hay fever.

The construction of many of the

buildings at "A Century of Progress Exposition" points the way to possible trends in the housing of the people in large communities. Advances in artificial lighting and mechanical ventilation have made possible the use of windowless buildings, providing comfort to visitors, and permitting a better utilization of wall space because of the lack of windows. The constancy of the lighting on exhibits as a result of this arrangement has been a large factor in reducing eye fatigue, which was so objectionable in many museums and expositions of an earlier day. Such windowless buildings would be out of the question were it not for the modern appliances available for maintaining the air in a condition conducive to health and comfort.

On the other hand, some buildings erected at the World's Fair have walls made entirely of glass. Here we have the two extremes—the windowless building and the house which might be called "all windows." Even in these glass houses, mechanical ventilation has been used to control the air conditions so that the windows need not be opened. In this way, better control may be maintained over the temperature and humidity of the air inside the building, and dust and odors may be excluded.

The provision of proper air conditions in buildings used as the homes and workshops of the people in large communities is far more than a mere mechanical or engineering problem. It

* Presented before the Public Health Engineering Section of the American Public Health Association at the Sixty-second Annual Meeting in Indianapolis, Ind., October 16, 1935.

is largely a social and economic problem as well. Complete air-conditioning apparatus cannot be afforded today by large sections of the population, so we must assure sufficient natural ventilation by judicious city planning, zoning restrictions on overcrowding of buildings upon the available land, and by suitable provisions in the building code regarding the size of windows, ceiling heights, and similar factors.

Another important consideration, especially in small homes, is the lack of any assurance that air-conditioning apparatus, if installed, would be maintained in an operating condition after the buildings became old and rundown. It is the experience of large cities that as soon as the profits from any building dwindle, the management is prone to economize by restricting the operating of ventilating equipment, and by failing to make the necessary repairs and replacements of essential parts of the equipment as they wear out.

For this reason, it is my opinion that public health engineers should oppose efforts to substitute mechanical for natural ventilation in small dwellings. It is probable that large buildings can make use of artificial air supply and lighting for interior rooms to advantage when the high achievements of these two arts are considered.

The air in factories and workshops is subject to contamination with many substances, some of which are dangerous to life. There is a tendency to use new materials and processes which offer the prospect of lower production costs and increase profits, without first taking the time and trouble necessary to determine what effect the change will have upon the health of the workmen exposed to the new substances. Frequently, definite information upon the physiological reaction of an individual to a substance is sadly lacking, and the manufacturer does not know where to turn for authoritative informa-

tion. Under these circumstances, he is likely to assume that there is no hazard and commence use of the new material.

Not infrequently the toxic effects are slow in making an appearance, whereby they may be recognized, and a false sense of security may be built up, as was the case with methyl chloride in domestic refrigerators. We have found that very small concentrations of other halogen compounds, such as carbon tetrachloride for example, may be toxic to workmen exposed to them for 7 or 8 hours a day over considerable periods. The amounts of these substances which produce illness are very much less than the toxic limit as given in the literature based on experiments involving only a short exposure.

The great strides which have been made in chemistry in this country during and since the war have made available to our manufacturers a wealth of substitutes for toxic materials, so that today there is little excuse for any industry to use substances that are highly toxic to the workmen. For example, in many places, xylol, toluol, and petroleum distillates have been substituted for benzol as a solvent for rubber, lacquers, enamels, and other substances. Titanium oxide and lithophone are being substituted for the more toxic lead in paints in order to reduce the hazard of lead poisoning.

One danger to be guarded against, is the possibility that unforeseen conditions may create a wholly unexpected health hazard against which no protective measures are being taken. For example, a recently developed refrigerant, dichlorodifluoromethane, has been declared by its users to be ideal because of its inert character and its favorable physical characteristics, such as the boiling point. This material may decompose in the presence of a flame, forming the dangerous gas, phosgene. A carbon tetrachloride fire extinguisher

if used in an atmosphere poor in oxygen may permit the formation of the same substance. Public health engineers must learn to recognize the possibilities of such occurrences and to guard against them.

It may be that studies now being made and the example set by the exhibit buildings at the World's Fair may result in a new conception of housing people in great cities. The use of new materials and new adaptations of old materials, together with the emphasis upon plain, unadorned surfaces, the use of color, and the relation of masses may have a decided bearing upon the architecture and mode of construction of the homes and workshops of the future.

It is probable that people would be better housed if cheaper and less permanent forms of construction were employed for erecting houses having a useful life of 10 or 15 years. The advances to be anticipated during the life of the buildings would warrant their demolition at the end of that time, and the erection of new, more healthful, and more comfortable dwellings in their place. Of course, the financing of such a scheme would be dependent upon reduction of costs, and perhaps also to some extent upon factory fabrication, as well as mass production.

The public health engineer is eminently fitted by training and experience to take a leading part in such a movement, with the object of removing existing insanitary and unhealthful dwellings and replacing them with houses where health may be properly safeguarded at little or no additional cost. A danger to be guarded against is the sweeping aside of health considerations in an effort to cheapen buildings. This must not be permitted, as it is false economy, penny-wise and pound-foolish, and the members of this Association should be on the alert in their own communities to detect trends

in that direction and combat them with every means available.

There remains the question of outdoor air. When one travels from the uninhabited mountain peak or primeval forest to a city, he expects to encounter an increasing amount of air contamination, even outside of buildings. Heating plants, chemical and fertilizer factories, packing plants, steel mills, oil refineries, smelters, coal yards, cement mills, restaurants, power houses, railroads and steamships, all contribute their quota of smoke, ash, dust, fumes, gases, and obnoxious odors.

Some of these materials affect the human body directly, such as arsenic compounds from smelters and foundries, acids from metal plating works, and sulphur compounds from many sources. Perhaps the most widely known example of this direct action is the poisonous fog which settled in a river valley in Belgium in December, 1930, and caused 65 deaths. Investigation revealed that these deaths were due to sulphurous anhydride gas from a nearby industrial district. That occurrence received widespread attention because of its dramatic suddenness and the imaginative theories expressed in the newspapers connecting it with hidden stores of war gases.

The higher pneumonia death rate in urban than in rural districts has been blamed by some upon the inhalation of toxic substances in the air, which contribute to a premature death as surely, if not as quickly, as in the Belgian incident.

At the Fort Worth meeting of this Association, Dr. Fred O. Tonney and Clarence R. De Young¹ described the correlation between pneumonia deaths and ultra-violet radiation in the sunlight, showing that a decrease in actinic rays was followed, a month or two later, by a corresponding increase in the pneumonia death rate. It is possible and even probable that the

increase in contamination of the air by smoke and ash, which serves to cut down the ultra-violet light in winter, also affects the individual directly, thereby having a double-barrel effect upon the unfortunate victim.

When one considers that great attention is paid to the purity of water, milk, oysters, and other food, while the amount of gaseous and solid waste discharged through chimneys and stacks has largely increased with the growth of cities and industries, it is easy to see how greater amounts of harmful substances may enter our bodies in the air we breathe than in the food and water we swallow. Many people do not realize that from 4 to 7 times as much air, by weight, enters our bodies, as food and water combined.

The effect of air contamination upon our greatest natural germicide, the sunlight, is doubtless an important factor in the spread of common communicable diseases during the winter. Of course, the rôle of sunlight in preventing rickets is too well known to need comment here. In spite of the ease with which rickets may be prevented, it is still too common, and sometimes found where you would least expect it.

Contamination of the air with carbon monoxide on and adjacent to heavily travelled boulevards and streets is a factor to be reckoned with in promoting vitality and adequate resistance against disease. Only those who suffer with hay fever fully appreciate the importance of keeping out-door air free of irritating pollen by destroying weeds before they pollinate.

Smoke has created another hazard to life since the birth of aviation, namely, the poor visibility over cities where air lines center. A great deal of discussion has occurred in Chicago, for example, as to the feasibility of creating an airport on the lake front near the heart of the city, the greatest drawback to the proposed location be-

ing the poor visibility occasioned by smoke. Thus far this objection has been serious enough to prevent undertaking the project.

Many devices are in use to reduce the contamination of out-door air. Some aim at more complete combustion of fuel to eliminate soot and black smoke, but do not always prevent blowing large amounts of ashes and fine cinders from the stacks. Other devices reclaim valuable products from the gases emanating from such places as refineries for precious metals and smelters. These may be various forms of filters or Cottrell precipitators, using the well known repellant action of similar electrically charged particles. Washers and scrubbers are widely used for removing dust and acid fumes, and chlorination has been used successfully to control objectionable odors from garbage reduction plants and similar places.

One other form of health menace reaching us through the medium of the air remains to be considered briefly—noise.

The growing mechanization of industry and transportation, and the development of radios and amplifying systems have greatly increased the noise of which large communities are victims. This problem must be considered in two sections: (1) the noisy industries where re-design of machinery for more quiet operation is possible; and (2) community noises which are the sum-total of many minor noises.

The former can be minimized by properly directed industrial hygiene work, pointing out to employers the losses of accuracy and efficiency occasioned by a noisy environment, the high cost of replacing employees unable to stand the continued wear and tear on their nervous systems, and the losses due to deterioration of machinery.

Studies have indicated that the cost to an industry of replacing even a common laborer is \$25, and this cost rises

rapidly with the degree of skill required of the employee. Added to these direct costs to industry, there are the burdens imposed upon all taxpayers for the maintenance of institutions for those suffering from nervous and mental diseases. These conditions are particularly affected by noise.

The second classification of community noises can better be dealt with by education of the public as to the benefits accruing to themselves and their neighbors as the result of maintaining a reasonable degree of quiet. Certain things, such as the sale and discharge of fireworks, may perhaps be controlled by laws; but there are so many other sources of noise which are parts of the grand total that it would be impracticable to make and enforce laws to prevent all of them. Therefore, education is the principal weapon to be used in fighting them.

That the public is becoming noise-conscious is reflected by advertisements of apartment buildings which stress the fact that the building is sound-proof rather than the desirability of location or other features calculated to attract tenants. An article appeared a few days ago in a large metropolitan newspaper headed, "Court O.K.'s Purchase of Silent Cars." This item stated that the court had authorized the receiver for a street car company to purchase some new cars, and the feature of these being silent was the most interesting to the public was the quietness of their operation.

It is my opinion that there will be an increasing amount of attention given in the near future to preventing unnecessary noises at their sources by better design of machinery and switching from noisy to quiet operations, as, for example, from riveting to welding of steel structures. In this movement, too, the public health engineer should take an active part to stimulate progress along the proper lines and assure that

the nervous systems of our people are given as much consideration as their freedom from communicable diseases and protection against the hazards peculiar to childhood.

CONCLUSION

There is danger that we may become hopeless and apathetic toward the hazards to health involved in conditions of the air, such as noise and contamination by toxic and otherwise objectionable substances, both inside and outside of buildings, because of the immensity of the problems and the rapidity with which new aspects arise with the development of new processes and industries.

Although progress has been made in some directions, the degenerative diseases stand out as unconquered obstacles to attaining the aim of public health work, prolonging life and making it richer, more useful and happier while it lasts. How much of these degenerative diseases can be prevented by improvement of the environment may be difficult to predict, but there is no lack of medical authorities who suspect a connection between lung cancer and the tar in soot. Nephritis is doubtless promoted by the toxic substances absorbed during the course of early and middle life, even though it may not definitely develop until later. It is safe to say that continued progress in public health protection must include some measures directed against the present principal causes of death.

We must bring to bear on these problems of the atmosphere the same careful thought and investigative attitude that have been responsible for the outstanding progress made in some other lines of health protection, such as in treatment of water supplies or reduction of infant mortality. We must keep ever before us the fact that the health hazards present in the air we breathe affect the entire population regardless

of age, and in this respect they transcend in ultimate effect those dangers limited to any one group or age.

Two things appear to be outstanding needs of the moment—(1) more authoritative information and (2) education of the public in order to secure enthusiastic and voluntary coöperation in the reduction of the health hazards. Fundamental data such as those collected by the U. S. Public Health Service, Mellon Institute, New York Commission on Ventilation, American Society of Heating and Ventilating Engineers with the United States Bureau of Mines, the National Safety Council, and the Local Safety Councils, the American Society of Mechanical Engineers, the Acoustical Society of America, this Association and others, are greatly needed, to envisage the seriousness and extent of the problems and to point out the most effective and economical solutions. The former lack of uniformity of opinion about the relative merits of natural and mechanical ventilation in schools and similar locations is just one example of the need for more extensive and complete information, and facilities for interchange of views.

This Association should endeavor to stimulate the collection of such needed data and use its influence to encourage research work by public health agencies and other institutions and the

financing by industries of studies relating to the health of their workers, neighbors, and the consumers of their products.

Effort to improve housing, both through the Public Works Administration for the relief of unemployment, and in other directions where such agencies are not operative, should be definitely promoted by the Association as such, and by the Fellows and members as individuals. New life should be injected into the campaign to secure an alert and informed public opinion to assure that the scientific data obtained is made effective in its application to health problems of communities, large or small. We should first devote our own zeal to the work and then get all of our fellow citizens to do likewise.

Only in this way can we hope to do more than scratch the surface of the serious and increasingly complex health problems presented by air conditions in the great urban centers in which so many Americans have chosen to establish their businesses and homes.

NOTE: This is the final article from the Symposium on Public Health Engineering Problems of Large Communities (see this *Journal*, Jan., pp. 64-67; Feb., pp. 108-121, and 158-160).

REFERENCE

1. Tonney, Fred O., and De Young, Clarence R. Smoke Eradication to Save the Health Value of Urban Sunshine. *A.J.P.H.* 21, 4:344 (Apr.), 1931.

INDUSTRIAL HYGIENE

New Clinic for Occupational Diseases—New York University and Bellevue Hospital Medical College has opened a special clinic for occupational diseases, with a laboratory equipped for the work. Cases of lead poisoning, silicosis, occupational dermatoses and benzene poisoning have already been handled in the clinic, which meets Wednesday afternoons. Physicians and industrial health workers have been invited to refer cases.—*J.A.M.A.* 101, 26:2057 (Dec. 23), 1933. E. R. H.

Tercentenary of the Birth of Bernardino Ramazzini — The entire monthly issue of *Rassegna Della Previdenza Sociale* (Anno XX, N. 10, Oct., 1933, 114 pp.) is devoted to the papers and reports connected with the celebration of Ramazzini's birth—"the father of industrial medicine." Papers were presented by the following professors: Luigi Devoto, Cesare Biondi, Luigi Carozzi, Giuseppe Francioni, Cesare Giannini, Giovanni Lorica, Giuseppe Marangoni, Giovanni Mauro, Antonio Mori, Gaetano Pieraccini, and Gustavo Pisenti. The celebration was held at Milan on October 4, 1933. The papers all pertained to the different activities of Ramazzini, who, in some respects, apparently lived some 300 years in advance of his time. E. R. H.

VII International Congress on Industrial Accidents and Diseases, Brussels, 1935—Announcement has just been received from Dr. L. Dejardin, Secretary-General, of the plan to hold this Congress in mid-July, 1935. As customary it will be divided into two sections representing the International Congress on Industrial Accidents and

the similar Congress on Labour Medicine, both meeting together. Chairmen, so-called "Presidents," have been set up for the various countries who are to proceed to give publicity to the Congress and to organize delegations to attend. Emery R. Hayhurst, Ohio State Health Department, Columbus, has been designated Chairman for the American Delegation for the Section on Industrial Diseases and those interested should communicate with him directly. E. R. H.

Robert Prosser White, M.D., Edin. (Obituary)—Dr. Prosser White, who died at Southport on Jan. 4 at the age of 78, had won for himself an international reputation in industrial diseases. He took his medical degree from Edinburgh University in 1878. He was appointed a certifying factory surgeon in August, 1896, and published a paper on nitro- and dinitro-benzol poisoning at that time. An appointment as physician in charge of the skin department at the Royal Albert Edward Infirmary gave him first-hand knowledge of the skin affections associated with the local industries, and in 1915 he published the first edition of his work on "Occupational Affections of the Skin" which appeared as a greatly enlarged edition some 10 years later. He was an Associate Editor of the *Journal of Industrial Hygiene*. He possessed a large capacity for work, and maintained his keenness throughout a long life; he did not regard himself as a great clinical dermatologist, but rather as a collector of information. It was thus that he started in October to attend the tercentenary celebration in Milan of the birth of Ramazzini, whom he admired

for his spirit of adventure and inquiry. Ill health prevented his attending this celebration, but the substance of his address appears on page 114 of the *Lancet* for January 13, 1934. He gave to the library at Wigan, his native town, a number of sixteenth and seventeenth century works on dermatology and the occupational diseases.—*Lancet*, 5759: 111 (Jan. 13), 1934. E. R. H.

Tenth Anniversary Moscow Institute of Professional Diseases—This celebration is in the name of V. A. Obuch. The Institute was founded by the Section of Common Health of the Council of Moscow, July 23, 1923, being the first of its kind in the Union. The Institute studies systematically the professional diseases in the industries of Moscow for the purpose of promoting industrial hygiene, improving the general health through the organization of medical and prophylactic work, the listing of properly skilled physicians, and education procedures.

During the ten years of its existence, the Institute published 32 collections of its works and 690 articles, some appearing abroad, also a series of pamphlets, leaflets and placards.

At present, the Institute has the following divisions: (1) Professional Hygiene for studying special branches of industry, each of which has its doctor of hygiene, promotes the selection of proper workers, etc. A comprehensive laboratory is provided for research and tests. (2) A Clinic, having 250 beds, also has laboratories and relates clinical findings with industrial influences. One section with 30 beds, called a half-way station, permits aptitude tests. Another section, with 25 beds, specializes in the selection of young workers. (3) The Physiological Laboratory is one of the largest in the Union. This concerns itself with both the theoretical questions of industrial physiology and those of experimental toxicology.

The various industrial plants are represented in the Institute where workers also take an active part in the deliberation of questions extant.

"Informing you of its anniversary, the Institute hopes that this celebration will serve to unite the specialists of (the) professional hygiene and pathology working in the different countries." The statement is signed by Arnautoff, as Director of the Institute, and Smirnoff, as President of the Jubilee Commission. E. R. H.

Japanese Institute for Science of Labour, Annual Report, 1932—This lists researches finished in 1932 such as environmental conditions, rationalization of labour, fatigue researches, qualification of workers, and occupational diseases. There follows a list of lectures and reports at various meetings and congresses.

The bulk of the report is devoted to abstracts of papers published in *The Journal of Science of Labour*. There is also published a Japanese Year Book of Social Hygiene, while 5 of the major papers published in 1931 and 9 of those published in 1932 have been translated into English and German, and appear in the Journal of the Institute. Some of the workers have been students in American educational institutions.—Gito Teruoka, Director, Kurasiki, Japan, July, 1933, 25 pp. E. R. H.

Report upon the Work of the Miners' Phthisis Medical Bureau for the Three Years Ended 31st July, 1932—This is an extensive, long page, closely printed report with tables and schedules, too extensive to abstract, but treated under various subjects such as: pathological and other investigations, the exactions required in the examination of workmen having in view compensation matters, silicosis (with an extensive discussion), likewise tuberculosis, benefits and beneficiaries, Euro-

pean and native laborers, etc. The report is by Dr. L. G. Irvine, Chairman.—Union of South Africa, April 13, 1933, 62 pp. (Procurable from the British Library of Information, 270 Madison Avenue, New York, N. Y., price 3s. 6d. Code U. G. No. 22, 1933. 3804—3/6/33—750.) E. R. H.

Abstracts of the Reports of the Institute of the Science of Labour, Japan—These abstracts are rendered in English and are taken from the *Journal of the Science of Labour*, Vol. 5, No. 1-5, first half of 1928. The pamphlet (9 pages) abstracts 17 papers pertaining to the physiology of the worker, the effects of the environment upon him, intelligence tests, and measurement of norms.—Kurasiki, Japan (received 1933). E. R. H.

Eighth Annual Report, Ontario Department of Health, for the Year 1932 (Industrial Hygiene Branch)—The personnel of the Industrial Hygiene Branch consisted of a Director, Clinical Specialist, Special Research (Worker), Chemist, and Chief Sanitary Inspector. The demands upon the facilities of the Branch or Division have considerably increased in spite of industrial unemployment, due no doubt to the emphasis upon sickness from the economical standpoint and that labor turnover is reduced to a minimum. Also, voluntary health work by employers has but seldom been discontinued, which would suggest that the procedure rests upon a sound basis.

Special discussion pertains to: (1) ventilation, in which it is found that overheating in winter is the most common failing; there is no satisfactory evidence to support the claim that increased humidity has a beneficial effect on healthy people, while there are also no data showing a relation to exist between the incidence of sickness and ventilation conditions, so that the use of

sickness experience as a general indication of ventilation appears not to be warranted. (2) Occupational diseases; at the last session of the Legislature, are required to be reported by all physicians and to the Provincial Department of Health, where it has been found that thus far suspected cases of lead poisoning and silicosis predominate. (3) Surveys made of trades or occupations with exposure to silica dust, particularly foundries and vitreous enameling, also the examination of rubber workers exposed to talc dust, others exposed to marble dust, the examination of 168 contacts (wives and children) of miners with silicosis and tuberculosis, with direct evidence of spread; the examination of a rubber shoe factory with the suggestive evidence that the inhalation of fumes of gasoline or like solvents assists the development of tuberculosis; and the increased physical examinations made necessary through the new regulation of the Factory Act. (4) The control of dust and fumes with caution in regard to the installation of ineffective equipment, also the surveying of the potential hazards in a considerable number of plants in various industries. (5) The work of the industrial hygiene laboratory—estimation of the amount of lead in the air, autopsies, the discovery that in a number of incidences neither the employer nor the employee was aware of the constituents of hazardous materials used. (6) First-aid and health posters. (7) Fumigation with cyanide compounds, attended with 6 fatalities during the year. (8) Sanitary inspection, particularly in relation to lumber, timber, and mining camps.

A separate leaflet embodies regulations of the Factory, Shop and Office Building Act, adopted Sept., 1932, particularly pertaining to the industrial use of benzol and lead and requiring that all manufacturers, distributors, employers, using substances dangerous to

health "when required by the Chief Inspector of Factories on advice of the Director of the Division of Industrial Hygiene, must post in a conspicuous place printed forms to be approved by the Department of Health setting forth these dangers and indicating the precautions necessary for the protection of their employees."—Dr. J. Grant Cunningham, Director, Division of Industrial Hygiene, *The Report*, pp. 36-40 (plus leaflet mentioned). E. R. H.

Occupational Poison and Disease Statistics, New York State Division of Industrial Hygiene, Jan.-June, 1933—This typewritten report comprises 3 tables, the first of which shows the make-up of the 402 claims from New York City and "Up-State"; the second, the causes arranged in alphabetical order by months; and the third, the leading causes, in a general summary. Of the 402 cases, 20 had a doubtful classification, and 58 were not in the schedule (of compensable diseases). The leading causes in the compensable list were, with cases, lead, 40; benzol, etc., 39; carbon bisulphide, 10; tetrachlorethane, 14; chrome, 9; carbon monoxide, 17; acids, 9; petroleum products, 13; friction, 17; dermatitis, 141 (acids 5, alkalies 70, oil 45). Notable causes in the non-compensable list were: carbon tetrachloride, 7; dermatitis, non-scheduled, 21; diseases, non-scheduled, 19; dyes, unspecified, 9; dyes, specified, 7; hydrogen sulphide, 10; lacquer, 5; poison ivy, 35 (possibly scheduled); trisodium phosphate, 4; turpentine, 4.—J. D. Hackett, Director, 40 Centre Street, New York City.

E. R. H.

Child Labor Under the N. R. A.—The National Recovery Administration has adopted the principle that a 16-year minimum age for full-time employment should prevail throughout industry. Over a hundred permanent

codes of fair competition have been approved and were in effect by November 15, 1933. These include many important manufacturing and mining industries and most of the retail dealers. The codes prohibit the employment of children under 16, with the exception of the general retail code which permits children between 14 and 16 to work part time outside school hours; 18 has been fixed for a number of dangerous industries or for certain hazardous processes. Through these codes a real beginning has been made in restricting child labor. Much, however, remains to be done, particularly in securing a more complete coverage of dangerous occupations by the higher age standards. Furthermore, certain forms of child employment—e.g., in street trades, domestic service, and commercialized agriculture—will be difficult to regulate under the National Recovery Administration.

The article details further relationships of this question as regards various trades, vocational guidance, legislation, etc.—U. S. Children's Bureau, *Child-Welfare News Summary* (Nov. 24), 1933. 8 pp.

E. R. H.

Sickness Among Male Industrial Employees in the Third Quarter of 1933—The reports of industrial sick-benefit associations show a lower rate of sickness causing disability for 8 consecutive days or longer per 1,000 men during July, August, and September. The rate was 65.3 as compared with 77.0 in the third quarter of 1932 and 88.8 in the corresponding quarter of 1929. Both respiratory and non-respiratory diseases were decreased, in the quarter under discussion.—Dean K. Brundage, B-268, U. S. Public Health Service, 3 pp.

E. R. H.

Insulation Against Heat and Cold for Human Comfort—A study was made of the uses of bright metallic surfaces since they reflect much of the

heat they receive. The method of insulation also took into consideration the low heat-conducting properties of air and the fact that an air-proof material hinders the passage of heat by convection currents. Briefly, the insulator is a sheet of reinforced aluminium foil—*i.e.*, material covered on both sides with aluminium foil—fixed so as to divide the air space across which the transference of heat is to be hindered. Laboratory tests were first made at the London School of Hygiene and Tropical Medicine and then followed up for practical experiences in Egypt, also on ships, and in tents, trains, and ambulances. A tropical helmet was devised which also proved its efficacy.—G. P. Crowden, *Lancet*, 5758:37-40 (Jan. 6), 1934.

E. R. H.

Report of Industrial Hygiene Committee, State and Provincial Health Authorities—The control of occupational diseases is fundamentally a public health problem. The efforts of public health organization, it should be appreciated, will be rendered less effective unless adequate attention is given to the large groups of industrial workers. The relations are significant in regard to the so-called "degenerative diseases," and the influence upon same of dangerous or unwholesome environment. Evidences to this effect are noted by Dublin in the mortality experience of this group in which, *e.g.*, it is shown that a 20-year old worker engaged in the non-hazardous occupations has a life expectancy seven years longer than the "industrial worker" beginning at the same age.

The industrial hazard situation may be said to simulate an epidemic with the focus of infection in the contaminated workroom. Just as public health authorities have learned the necessity of providing well trained men to locate and eliminate the source of an epidemic, a no less well organized bureau should

be considered for the elimination of the source of the occupational disease. The importance of the subject is manifested by the growing interest in industrial hygiene in the various states, such as the adoption of codes specifying the maximum amount of toxic material to which workers may be exposed. Likewise a number of universities have seen fit to provide special courses in industrial hygiene.

Any program for the control of occupational diseases necessitates:

1. Reporting and investigation of cases.
2. A comprehensive knowledge of the effects upon health of materials and processes used in industry.
3. Physical and chemical determinations of industrial environments.
4. Laboratory facilities.

The health department, made up of its different types of workers and functions, provides the basic facilities and technical staff necessary for the control of occupational diseases.

The industrial hygiene activities of health agencies was inquired into by means of a questionnaire with a summary by states, including Connecticut (surveys, special studies, and lists of hazards); Indiana (a brief statement of some limited investigations by the Division of Industrial Hygiene); Michigan (discontinuance of its Bureau of Industrial Hygiene due to lack of funds); Mississippi (health and educational program); Ohio (suggestion of points to be stressed); Ontario, Canada (with brief statement of its major activities); Rhode Island (liaison with the factory inspector and the contemplation of organizing a Division of Industrial Hygiene).

The American Public Health Association has 8 committees active in industrial hygiene (consult annual *Year Book* for reports). The U. S. Public Health Service, through its Office of Industrial Hygiene and Sanitation, lists a number of important activities.

A brief discussion follows by certain states.—Stanley T. Osborn, Chairman, *The Proceedings*, 47th Annual Meeting, Washington: 149–155 (June 2–3), 1932.
E. R. H.

Ventilation, Sunshine, and Clothing—This is a comprehensive article based largely upon animal experiments, including guinea pigs, rabbits, pigeons, and monkeys, and the conclusion was reached that properly fed animals remain remarkably free from disease under various environmental conditions, while improperly fed animals, however well kept, are remarkably subject to it. Heat-stroke and its avoidance was a feature of investigation as well as control of epidemics by ventilation, such as the spreading apart of beds and opening the windows of dormitories as advocated by Captain S. F. Dudley. Thus infection cannot be stopped by isolation of the sick; but it can be enormously reduced by good ventilation. The cubic space of a room is of no importance; it is the ventilation which counts. The dusty, warm atmosphere of crowded rooms not only spreads infection but lessens the defence of the membrane which lines the breathing passages. Every sedentary worker can devote some of his spare time to open air exercise.—Leonard Hill, *Lancet*, 5747:933–936 (Oct. 21), 1933.

E. R. H.

Occupational Disease Hazard of Silicosis in Construction Operations and Its Prevention—This paper is based on approximately eight years' definite personal study of the effect of underground dusts on health and safety, supplemented by about 25 additional years of close attention to data and studies made by others. The author has conducted intensive study in more than 100 coal and metal mines and in scores of mining communities in twenty-five states, first as a mine surveyor, then

as a coal mine superintendent, and finally with the U. S. Bureau of Mines. The subject is handled from an engineering viewpoint which has convinced him that "stop the dust" is the only feasible solution.

The general physical characters of dust, pathological relationships, the various hazardous operations, the futile and often very expensive installations made by well-intentioned employers, the comparison of foreign experiences, and the fact that after all the real solution lies with the engineer, are all discussed. Rules are laid down for the best procedures and certain citations were made from current literature. A very extensive bibliography is appended, classified as to sources of material, particularly along engineering, mining, metallurgical and related lines.—D. Harrington, 13 pp., from address presented before Construction Section, National Safety Council, Oct. 2, 1933, published by U. S. Bureau of Mines (not coded).

E. R. H.

Silicosis—This pamphlet, profusely illustrated, aims to present to manufacturers a brief description of the disease, its causes and complications, and a more detailed discussion of measures designed to prevent its occurrence.

There are included: industries and processes using silica, a table showing the uses of silica, and the types of silica used in each; harmfulness of silica dust; dust determination; standards of dustiness; how silica reaches the lungs; symptoms and diagnosis of silicosis; the complication with tuberculosis; classification by stages; prognosis; and preventive measures.

The last subject is given special emphasis under the head of protective devices, good housekeeping, medical supervision, the practical application of local exhaust equipment, of segregation and special equipment, and plant surveys. A selected bibliography fol-

lows.—Industrial Health Section, Met. Life Ins. Co. 1933, 32 pp. E. R. H.

Lead-Poisoning, Legislation and Statistics—This bulletin reviews legislation and statistics for lead poisoning in several foreign countries as well as in the United States, and should be consulted in the original for the many valuable deductions made. It is replete with tables and a considerable number of case reports. The statistics pertain to the years 1930–1931, and were partly derived from a questionnaire. The recorded deaths from lead poisoning in the United States for the year 1930 was 99. There is included also a reference to the Reports of the Committee on Lead Poisoning, A.P.H.A., which appear in the annual *Year Book* and elsewhere in the *Journal* for the last several years. The author was Chairman of the Subcommittee on Statistics of this Committee. The concluding portion of the report is the translation of the report of the Swiss Accident Insurance Society (Director Tzaut), made to the Federal Commission on Lead-Poisoning, May 7, 1929.—Frederick L. Hoffman, Consulting Statistician, Prudential Insurance Co. of America, Newark, N. J. 1933, 40 pp. E. R. H.

"Industrial Medicine"—The September, 1933, issue of this new publication (Vol. 2, No. 3) comprises pages 145–204 with table of contents, major papers, industrial hygiene digest, announcements and news.

The major papers comprise the following:

Occupations of Antiquity, by Robert T. Legge (University of California), which in particular discusses the earliest known mention of the various metals and where found, and the earliest references to occupational diseases. The author considers the earliest dangerous trades to have been implement and armor making, the construction indus-

try, husbandry and agriculture (a brief paragraph), the bronze age, metallurgy and mining, the glass industry, and pigments and cosmetics. The article also reviews primitive surgery and industrial hygiene and concludes that the latter subject has been a progressive one and did not "begin with the invention of the steam engine."

"Compensable Back," by Dr. John D. Ellis—the technic of examination; exaggeration and malingering.

Psychology of Trauma, by Dr. Jewett V. Reed (Indianapolis)—classification under the heads of malingering, neurosis following trauma, and mistaking the cause and effect.

Carbon Dioxide—An editorial summary covering its hazards and uses.

Health and Business Recovery, by Dr. Hart Ellis Fisher, Chicago Rapid Transit Company.

One Hundred Books for the Doctor—A special selection of recent titles.

Coal for Industrial Hygiene, by Dr. Dean K. Brundage, Statistician, U. S. Public Health Service.

Vocational Rehabilitation—Its History and Scope of the National Program, by John A. Kratz, chief, Vocational Rehabilitation, Federal Board.

There are also many important fillers.
E. R. H.

Papers in The Industrial Bulletin, New York Department of Labor, Aug., 1933—

The Next Step in Industrial Hygiene—A brief discussion to the effect that there must be a vigorous application of hygienic ideas in industry and especially that relating to the control of dust, fumes and gases at their points of origin.—J. E. Hackett, Sept. issue, p. 200.

Lead Poisoning and the Depression—Essentially a discussion of the nature of lead poisoning and the fact that along with the modernizing of public and industrial institutions must be considered

the inclusion of advanced methods in the protection of workers against lead poisoning.—May R. Mayers, Sept. issue, pp. 201–202.

Review of Silicosis, Part V—The prevention, dust estimations, and educational procedures necessary to cope with this hazard.—Adelaide Ross Smith, Sept. issue, pp. 224–226.

Corrosion in Exhaust Systems—A discussion of the electrolytic and acid theories, illustrated, along with methods of testing materials for equipment in advance of their usage.—John H. Vogt, Oct. issue, pp. 252–254.

Review of Silicosis, Part VI—Silicosis compensation in the United States and requirements of an adequate silicosis compensation law. Under the latter heading, the necessity for a defi-

nition of silicosis and its stages, eligibility for compensation, diagnosis by expert authorities, and the amount of compensation.—Adelaide Ross Smith, Nov. issue, pp. 308–309.

1932 Directory of New York State Manufacturers, Volume II, Metropolitan Area—This is procurable from the New York State Department of Labor, 80 Centre St., New York City, Directory Division, price \$5.00.

Skin Diseases in Industry—Case citations and general discussion.—May R. Mayers, Dec. issue, pp. 314–315.

Carbon Monoxide Poisoning and Compensation—Case citations regarding a truck driver, also a garage worker, who were exposed to high concentration of the gas.—May R. Mayers, Dec. issue, p. 315.
E. R. H.

FOOD AND NUTRITION

Is Salmonella Food Poisoning Caused by Living Bacilli or by Thermostabile Toxic Products?—Eight human volunteers ate custard cultures of *S. enteritidis* or washings from such cultures, the cultures and the washings having been heated or filtered so that supposedly they no longer contained living organisms.

One volunteer swallowed a few living organisms in the heated washings, but was not made ill. Another ate custard that, by mistake, had been heated insufficiently to kill large numbers of the contained organisms, and this subject developed symptoms of severe food poisoning. Nine monkeys were fed with *S. enteritidis* in living suspensions, heat-killed cultures or sterile filtrates. Symptoms of gastroenteritis occurred only when living organisms had been fed. Heated and filtered cultures of enteritidis strains produced no symptoms of food poisoning when living bacilli were not present.

The results provide weighty evidence in favor of living bacilli, rather than thermostabile toxic products, being the cause of Salmonella food poisoning. The smaller the number of organisms swallowed the longer is the period of incubation. The first sign of illness in both man and monkeys was the development of diarrhea. Cultures of diarrheal stools were practically pure cultures of the swallowed organism, indicating that *S. enteritidis* had supplanted the normal fecal flora. As the symptoms subsided the fecal flora gradually returned to normal.

While enteritidis strains apparently differ in their ability to produce symptoms of food poisoning when fed, it seems probable that when one is working with a single strain, it is the number of living organisms and not their products or the nature of the suspending menstruum that is important.—Elizabeth Verder and Charles Sutton, *J. Infect. Dis.*, 53:262 (Sept.–Oct.), 1933.

The Occurrence and Origin of Lead in Canned Sardines—In routine examination of canned sardines the authors have found metallic impurities—both tin and lead. The tin content is generally 0.1 to 0.2 gr. per lb. The lead content is variable and considering its health aspect the figures submitted are significant.

Out of 596 samples examined, 37 per cent contained from 0 to 5 p.p.m. of lead; 32.6 per cent contained from 6 to 10 p.p.m., and 18.8 per cent contained from 11 to 20 p.p.m. Approximately 9 per cent of the samples showed a range between 20 and 40 p.p.m., and at the extreme range 3 samples contained between 71 and 80, 1 sample between 81 and 90, and 1 sample 150 p.p.m.

The general assumption has been that the lead was derived from solder on the cans. There are three possible sources of contamination: (1) natural lead content of the fish; (2) methods of packing, including the use of solder for sealing, and (3) contamination due to the method of preparation. Raw sardines were found to contain no lead. Samples showing excessive exposed solder compared to those showing little solder, and to those with "sanitary" seals where no lead is present, showed no correlation between the exposed lead or the absence of lead and the amount found in the fish.

There are two methods of preparation—the French method and the Portuguese method, both consisting in cooking the sardines on metal grills. In the French method the cooking is done with hot oil and the Portuguese method by means of a steam-chest at a temperature of 110°C.

Examination of the metal grills showed that they were tin-coated but the coating contained large amounts of lead—in fact, practically representing soft solder. Sardines cooked on old grills showed 44 to 57 p.p.m. of lead,

but fish on the grills newly tinned with block tin showed 7 to 10 p.p.m. It was found also that there is greater contamination from the steam cooking than when cooked in oil.

The authors definitely ascribe the contamination in canned sardines as traceable to the metal grills, although, of course, in some instances there may be a contributory addition where there is exposed solder in the cans. Two methods were used—the chemical method and the photospectrometric method. Figures are appended showing very close check between these two methods when known amounts of lead were added.—L. H. Lampitt and H. S. Rooke, *The Analyst*, 58:733 (Dec.), 1933.

The Comparative Vitamin A Content of Nut-Margarines and Butter—Butter is known to be a rich source of vitamin A but from the reports of most investigators nut-margarines rate low in this vitamin, although nut-margarines containing palm oil have been shown to promote growth in white rats, the palm oil content ranging from 10 to 15 per cent. This investigation concerns a number of uncolored nut-margarines purchased on the open market. After an 8-week feeding period for depleting the body-store of vitamin A in the animals, different samples of nut-margarines were supplied. Animals receiving higher levels of nut-margarines gained some weight during the first 2 or 3 weeks but did not retain it. The highest test at 1 gm. per day was not sufficient to maintain growth during the experimental period of 8 weeks. Better gains were shown on 1/20 as much butter as margarine.

Chemical analysis of nut-margarines showed the moisture variation from 4.34 to 16.69 per cent and the fat from 78.12 to 92.54 per cent. The authors conclude that these commercial nut-margarines are an extremely poor source

of vitamin A and the variation in the fat constituent of the different samples seems to indicate the desirability of establishing standards for this product.—Charles F. Poe and Hazel A. Fehlmann, *J. Dairy Sci.*, 16:559 (Nov.), 1933.

Metabolic Studies of Children with Dental Caries—A group of children ranging from 3 to 20 years of age, averaging about 10 years, was studied with respect to the influence in reference to the variations of diet on dental caries. Determinations of calcium and inorganic phosphorus in the serum show practically no variation in the total amount in 3 groups, totalling 102 observations, the first group with no cavities and no caries, the second group with caries but not active, and the third group with active caries. Concentration of the calcium and phosphorus in the saliva did not differ in these three groups.

A study of the average retention of calcium, phosphorus, and nitrogen showed a correlation of the dental condition. There seems to be a definite relationship between the retention of calcium and phosphorus and the freedom from tooth decay. Calcium and phosphorus retention was also shown to be greater in the case of 7 subjects when the caries were inactive than in the same subjects with active caries. These observations furnish no evidence that dietary deficiency of phosphorus is a definite factor in the incidence of dental caries.

Histological studies show the prevention of caries as dependent upon the deposit of secondary dentin in the tooth and this deposit is determined by the metabolic activity of the individual. The individual utilization of the diets influences the resistance to decay which depends primarily on factors within the tooth. These data indicate that the optimum retentions of calcium and phosphorus are probably higher than

those usually accepted as adequate.—Julian D. Boyd, Charles L. Drain and Genevieve Stearns, *J. Biol. Chem.*, 103:327 (Dec.), 1933.

The Bleaching and Improving of Flour—Reference is made to the report and recommendations of the Departmental Committee of the Ministry of Health of England, published in 1927, and their conclusions to the effect that while not recommending elimination of bleaching agents and improvers, the use of these should be limited in amount. The facts remain that today these substances are more extensively used than ever and it is contended that it would be difficult to ascribe harmfulness in their use.

Different methods of bleaching are described. The essential of bleaching is the reduction of the yellow tint. The question is asked if there is an appreciable amount of vitamin A content contributed by this germ whether or not bleaching should be allowed. The point is raised further that stored flour might be regarded as of lower nutritional value so far as the vitamin A is concerned.

With respect to chemical improvers, to which much objection is registered, the parallelism is drawn between the use of chemical improvers in the food itself and the accepted use of mineral improvers added to the soil in which plant food grows. If the bleaching of flour or improving with chemicals is injurious to health it should be stopped, but no real scientific proof of this is alleged to have so far been produced. Among countries which forbid chemical treatment are France, Belgium, Italy, Greece, South Africa.

If America were to prohibit the addition of chemicals to flour it is held that England probably would follow such practice but it is debated whether this would improve the quality of bread in England and America which is held to be of a higher

standard than that in France where a treatment is forbidden.

In answer to the question whether chemical treatments alter the flavor of bread, the conclusion is reached that bleaching and improving processes did not influence bread flavor one way or the other. It is finally concluded that chemicals are not necessarily harmful in foods since sodium chloride is a well known chemical commonly used and it is recommended that the solution of the problem for the present is to consider every form of treatment or bleaching on its individual merits rather than to promulgate a general approval or disapprobation.—D. W. Kent-Jones, *J. Soc. Chem. Indust. (Chem. & Ind.)*, 52:409 (Nov. 24), 1933.

Bacterial Studies of Defrosted Peas, Spinach, and Lima Beans—Many fruits and vegetables are now preserved by the quick-freezing process. The problem of how frozen vegetables will keep in the home is an important one. Frozen foods may present a distinct public health problem, since knowledge of the bacterial and enzymatic changes that take place during freezing, storage and thawing is still far from complete. The work here reported was undertaken in the hope of contributing something to the knowledge of the bacterial content of defrosted specimens of a few commonly frozen vegetables.

Samples were obtained of fresh peas, spinach and lima beans. One portion of each was frozen by exposure to dry ice while another portion was held in the fresh state. Samples of commercially frozen products were all obtained. Samples of each were then set aside to be held for different lengths of time, one portion of each at 22° C. and one at 6° C. The length of such periods varied from approximately 12 to 72 hours. At the end of the period a quantitative bacterial count was made.

An attempt was made to correlate the types of organisms found in the defrosted samples with the types found in the fresh vegetables. Well isolated colonies were picked from the plates and transferred to agar slants. After incubating for 24 hours at 37° C., preparations from these cultures were stained by the Gram method and were examined for purity and morphology. Transfers were made into various culture media including litmus milk, gelatin, nitrate and tryptophane broth and into fermentation tubes containing dextrose, lactose and sucrose broths.

Fresh spinach, peas and lima beans when stored at 22° C. and 6° C. spoiled after 2 to 4 days, depending upon the initial condition of the product. Similar samples frozen in the laboratory and then defrosted spoiled after 12 to 24 hours at 22° C. and after 36 to 48 hours at 6° C. Commercially frozen samples of the same kinds of vegetables spoiled after 12 hours at 22° C. and after 24 to 36 hours at 6° C. Of the vegetables frozen in the laboratory the spinach spoiled most rapidly. Of the commercially frozen products, the spinach and lima beans spoiled more rapidly than the peas. Whether the more rapid spoilage of the commercially frozen products was due to the use of poor quality vegetables for freezing, to contamination during the process, or to an increase in the numbers of bacteria during storage is not known. The organisms isolated from the fresh vegetables included many micrococci, some bacilli, and a few achromobacter and sarcinae. The organisms isolated from the vegetables frozen in the laboratory included many bacilli, and a few achromobacter and micrococci. From the commercially frozen products were isolated many bacilli, some micrococci, a few achromobacter, and one diplococcus.—Elizabeth B. Brown, *J. Home Econ.*, 25:887 (Dec.), 1933.

CHILD HYGIENE

INFANT MORTALITY

SUMMARY

MORTALITY, MORBIDITY, FATALITY

1. Since the first measures of social hygiene in favor of mother and child were enforced in Germany in 1905 infantile mortality has fallen from 20.5 per cent of living births to 7.9 per cent in 1932.

2. In the past digestive troubles took first place among the causes of death. In the summer months especially, a great number of babies fell victims to summer diarrhea, so that the mortality curve reached a peak known as the *estival point*. In the course of recent years this has given place to the *hibernal point*.

Among the causes of high winter mortality the most important without doubt is the group of acute diseases (influenza) of the air passages, especially *inflammation of the lungs* (bronchopneumonia). A small part only of these pneumonia cases follows upon infantile epidemic diseases, in particular on measles.

Forty per cent of deaths caused by pneumonia in the first year of age take place in the first 3 months of the year (January to March).

MORTALITY IN PRUSSIA (PER 1,000 LIVING BIRTHS)

Year	Pneumonia	Digestive Troubles
1913	10.2	37.6
1930	11.0	10.2

Mortality following on diseases of the alimentary tract has thus very considerably diminished, while that due to pneumonia has to some small extent increased.

While the percentage of deaths due to

digestive troubles fell from 25 per cent in 1913 to 12 per cent in 1930—a 50 per cent reduction—that due to pneumonia rose from 6.8 per cent in 1913 to 13 per cent in 1930—a 50 per cent increase. The mortality of *preschool* age children has also much diminished, but the proportion of deaths *due to pneumonia* has also risen. Indeed this disease touches children particularly during their second and third years, when it is responsible for 28.3 per cent and 17.3 per cent of deaths.

3. Mortality statistics show the important place taken by diseases of the air passages during the first years of life. While we have learned how to fight by preventive measures the high death rate due to disease of the alimentary tract and to reduce it by two-thirds, we do not yet possess similar measures of preventing influenzal diseases. The danger caused by these affections to children in the early years of their life has rather increased than diminished. This has been noted in bad weather years such as 1918 or 1928–1929 (influenza years).

As in the fight against maladies of the alimentary tract the measures to be taken must depend on the clinical and socio-hygienic examination of the conditions that favor the outbreak and the development of the disease.

4. With regard to children we, in Germany, do not possess precise data concerning the *morbidity* of influenza infections nor concerning the *fatality* of pneumonia.

As a result of an inquiry set on foot by the League of Nations in 4 districts of Germany—2 *rural* districts and 2

urban (important centers)—we have established morbidity statistics from which we draw the following conclusions:

(a) Digestive troubles are much more frequent in towns than in the country.

(b) Influenzal diseases are scarcely more frequent in the big towns than in the country.

(c) *Prematurely* born or illegitimate children are not particularly menaced by influenzal diseases.

(d) The frequency of influenzal diseases is higher among rickety children.

(e) The frequency of influenzal diseases rises steadily until the second half of the first year of life has been reached.

Fatality statistics have been prepared on many occasions in Baby Homes and Children's Hospitals. Thus in the "Reichsanstalt zur Bekämpfung der Säuglings- und Kleinkindersterblichkeit," during the period from April 1, 1920, to March 31, 1929, the fatality rate from pneumonia among babies was 42 per cent, and from air passages diseases in general 22 per cent. We note therefore an extremely high death risk among babies suffering from pneumonia. (This is to be explained in great part by the fact that many children are only brought to hospital when in an advanced stage of the disease. Other statistics prepared by the City of Berlin Orphanage show distinctly the relation between immunity and death risk. Thus, while in 1921 and 1922—years when resistance was lowered by epidemics of measles and whooping cough—the death rate rose to 79 per cent. It reached 66 per cent, only, in 1924 and 1925 when general health conditions were better.

CONSTITUTIONAL AND CONDITIONAL FACTORS

5. The beginnings of inflammatory diseases of the upper air passages and of the lungs manifest themselves in two ways: the disease may have a primary character, that is to say, it may appear as an independent influenzal disease;

or it may have a secondary character—it may be a consequence of digestive trouble.

The evolution of an inflammation of the air passages depends, firstly, on constitutional factors, and secondly, on conditional factors.

Among the constitutional factors must be mentioned in the first place the condition of immunity; the less the natural resistance, the graver is the evolution of the disease and the more easily is pneumonia produced. Limited immunity is also a characteristic of an exudative diathesis and of certain cases of neuropathy (vegetative stigmatization).

Among the conditional factors, age, method of feeding, general nutrition, absence or presence of rickets play their part.

Among babies the appearance of pneumonia and its evolution seem to be greatly influenced by social factors. But from the second year of life the appearance of the disease and its evolution seem to be more related to other acute infectious diseases. The influence of social factors on pneumonia in the baby is made clear by the high mortality among illegitimate children who are stricken by this disease; even in the first week of life, their mortality figures are already significant. These figures rise, and continue to rise considerably after the third week, until in the second month of life they reach the triple of those of legitimate children.

6. Statistical research with regard to the moment of the appearance of primary lung diseases caused by an infection, and to the moment of the appearance of maladies following on digestive troubles—secondary diseases—shows that the latter manifest themselves almost exclusively in the first 3 months of life. Thenceforward they become rarer and rarer, disappearing completely in the second half year. Their number, concurrent with the diminu-

tion of digestive troubles, falls to one-third. Primary pneumonias almost never occur during the first 3 months, and become frequent only toward the middle of the first year of life.

ACUTE INFLAMMATION OF THE AIR PASSAGES IN INSTITUTIONS

7. The dangers occurring through contagious diseases, particularly influenza, in whole-time or half-time welfare institutions are well known. According to Pfaundler, the risk of contagion is about 5 times greater for children in creches, day nurseries, and institutions of all kinds than for children living at home. Babies cared for during a long period in an institution contract influenzal diseases about 4 or 5 times during the year. Among hospital babies pneumonia makes its greatest number of victims from December to April, and its smallest from May to October.

The total of hospital pneumonia cases and deaths depends also on other factors; should there be an epidemic of influenza, measles, or whooping cough, or should food be indifferent in quantity or quality, pneumonia figures go up.

PROPHYLAXIS

8. In the present state of our knowl-

edge our chances of preventing influenzal infections, particularly pneumonia, are few. Attempts are being made to prevent pneumonia by *specific prophylaxis* by means of vaccines and serums. The results are as yet not very satisfactory, but it is still possible to make progress in this direction.

For the moment one must try to prevent pneumonia by *general measures*, tending to increased immunity:

(a) By a quantitatively and qualitatively sufficient diet—(for the baby, of course, breast feeding).

(b) By hardening the organism by means of light and air—by artificial sunlight in winter in the countries poor in sunshine.

(c) By the rickets prophylaxis.

(d) By a modern organization of Baby Institutions (Hospitals, Baby Homes, etc.)—sufficient rooms containing only a limited number of beds, facilities for the isolation of the sick and of suspected cases, galleries for air cure, sufficient staff, and a carefully prepared and appropriate diet.—

Professor Dr. F. Rott, Berlin—*Die sozialhygienische Bedeutung der grip-palen Erkrankungen im Säuglingsalter, Association Internationale de Pédiatrie Préventive (Section Médicale de l'Union Internationale de Secours aux Enfants)*, Troisième Conférence, Luxembourg, les 27 et 28 septembre 1933.

PUBLIC HEALTH NURSING*

Write Miss Davis About This—To meet the demand of laymen who feel a new responsibility because of the economic situation for upholding public health nursing service the N.O.P.H.N. has prepared a series of five study programs for board and committee members.

The first course is a general introductory study of public health nursing in the locality of the group taking the course.

Another course covers the field of public health nursing publicity with full attention given to such media as newspapers, radio, printed material, talks, etc.

An analysis of a volunteer group is also offered. The organization of an active, interested, participating group of volunteers is studied, and methods suggested for utilizing a group of this kind in extending the service of the organization.

The fourth course is an analysis of case material and is devoted to a study of how this material may be applied in illustrating an organization's program. This course is in two series, one for city organizations and one for rural organizations.

The study of the relationship of the board to the professional staff is covered in the fifth course and is devoted to a *Personnel Manual*, recently published by the National Y.W.C.A.

Evelyn K. Davis, Assistant Director of the National Organization for Public Health Nursing, is in charge of the study program.—N.O.P.H.N. *Pub. Health Nurs. News*, 4 (Dec.), 1933.

* Please send printed matter or other material relating to public health nursing to Eva F. MacDougall, 6 State House Annex, Indianapolis, Ind.

Preventing Diphtheria and Scarlet Fever in Nurses—Durand Hospital in Chicago, with a capacity of 60 beds, receives only patients who are ill with infectious diseases (mostly diphtheria and scarlet fever). Nursing is done by student nurse affiliates from other nursing schools in Chicago under trained supervisors.

Every effort is made to protect the health of these nurses. Nose and throat cultures are made regularly each week; a high degree of cleanliness of patients and surroundings is maintained; their technic and procedures are rigidly supervised.

Careful records have been kept of the incidence of scarlet fever and diphtheria in the nurses while on duty. All are given the Schick test and the positives are immunized to a negative Schick before entering on duty. Not a case of diphtheria has developed among the nurses since December, 1927.

The Dick test is also given all nurses and a preventive injection of toxin is given all susceptibles. Not a single case of scarlet fever has developed among them since December, 1927, either.

The writers repeat the statement given in a former report: "By means of Schick and Dick tests followed, when necessary, with active immunization, nurses can be selected who are practically free from the danger of diphtheria and scarlet fever."—Ludwig Heketoen, M.D. and Charlotte Johnson, R.N., *J.A.M.A.* 102, 1:41 (Jan. 6), 1934.

More About C. W. A. Nursing—A Child Health Recovery program has been launched in California with 50 C.W.A. nurses, formerly unemployed,

at work, locating undernourished children. Later plans will be made to try to overcome the malnutrition, where it exists, and prevent further progress through dietary measures and, where necessary, corrective medical procedures. There will be a general supervisor of the nursing program with 5 district supervisors to work more closely with the staff nurses.—*Weekly Bull.*, California State Dept. of Public Health XII, 51:20 (Jan.), 1934.

The Illinois State Nurses' Association through its Placement Service has approved and assigned 600 C.W.S. nurses for service in public health in Illinois.—*Health Broadcaster* V, IX (Jan.), 1934.

Two Members of Our Section Make Changes—Katherine Faville, who has been head of the Department of Nursing, College of Liberal Arts, Colleges of the City of Detroit, on February 1 became associated with Marion G. Howell, Director of the Course in Public Health Nursing in the School of Applied Social Sciences, in Western Reserve University, Cleveland, Ohio.

Ruth E. Mettinger of Sanford, Fla., left her duties as Red Cross Nursing Field Representative for North and South Carolina, Louisiana, Mississippi, Alabama, Georgia, and Florida, January 29 to head up the Bureau of Public Health Nursing in the Florida State Board of Health.

On to Washington!—Many nurses and lay members of public health nursing boards are making plans to attend the Biennial Nurses' Convention in

Washington, D. C., April 23 to 27, inclusive. National Organization for Public Health Nursing headquarters will be at the Hotel Washington.

N.O.P.H.N. general session topics will be: New Developments in Public Health and Social Work; Public Health Nursing To-day; Maternal and Child Health, Communicable Disease, Nutrition, and Mental Health; The Changing Order and Community Planning.

There will be round tables according to population groupings and for school and industrial nurses. One session is left free for discussion of whatever public health nursing problems are most pressing in April.

There will be luncheons galore for: I.V.S. Advisory Council; Board and Committee Members; field nurses; Chairmen of Public Health Nursing Sections of S.N.A.'s. No nurse needs to be left out in the cold. She will belong somewhere every minute of the time.

The American Nurses' Association and National League of Nursing Education programs will be in an early issue of the *American Journal of Nursing*. The programs of the joint sessions will appear in the February, 1934, *Public Health Nursing*.

The American Nurses Association with over 120,000 members is the largest professional organization for women in the world and its convention in conjunction with that of the N.L.N.E. and the N.O.P.H.N. means a great deal to American nurses.—*N.O.P.H.N. Listening in*, III, 1 (Jan.), 1934.

EDUCATION AND PUBLICITY*

It Was "Almost 100 Per Cent News"—From time to time this department has urged the publicity value of studies in public health, even beyond the cities where they are made. Some are more widely usable than others, but the *News-Letter* of the Commonwealth Fund, New York City, reports on one of the extra successful reports:

Late in November, the Fund published *Maternal Mortality in New York City*, the report of a study made by the New York Academy of Medicine. This was greeted by the most extensive publicity ever accorded to any Fund publication. A summary prepared and issued by the Academy of Medicine led 310 newspapers in 39 states to devote 2,355 column inches to the report, and the clippings are still coming in. In New York City both the *Times* and *Herald-Tribune* printed the summary practically in full, starting on the front page. The *Times* and the *World Telegram*, and several papers outside of New York, discussed it editorially, and several weekly magazines, including the *Literary Digest*, *Colliers*, and *Time*, dwelt on the importance of the study. The *Journal of the American Medical Association* published the summary in full.

So extensive was the newspaper attention to the report that an article in *Editor and Publisher* made it the subject of discussion, analyzing, "as a test of intelligent news handling," the use made of "this almost 100 per cent news item."

Dr. Hooker, director of the study, knows of no less than 15 communities, including Buffalo, Philadelphia, Pittsburgh, Boston, Cincinnati, Atlanta, New Orleans, St. Louis, and Oakland, California, which have undertaken or are now beginning studies patterned after and stimulated by this project.

Looking Backwards to "How Difficult Is Truth"—Last month we quoted a statement about the certainty of recovery from diphtheria when a

case received "sufficient serum on the first day of illness," following this with a quotation from another source questioning the first statement.

The follow-up comes in a letter:

Although at first I felt you were a little rough on us, I do not now feel so after hearing from Dr. Park and, just by accident, from Dr. _____.

I doubt if anything in medicine is quite one hundred per cent. Probably Ivory soap has the percentage more clearly worked out.

I do not believe you intend the apparent inference that the statement was just an overnight haphazard somewhat random one not based on adequate consideration and study. As a matter of fact, back of it goes more than ten years of personal investigation of diphtheria deaths from the point of view of date of onset and the date of first antitoxin.

The writer of the above letter received the following from an authoritative source:

Of course I have serious objections to saying that anything invariably results from any given set of known causes. I dare say the day will come when the sun will not rise, if you can call that a day.

I do not know that Mr. Routzhan's statement is any more true than yours. I do not believe that anyone has figures based upon unequivocal data which would enable them to say what the percentage of deaths is. Obviously if one wanted to quibble he could say that no dose which failed to cure was sufficient.

Health education offers many such perplexing situations.

The Twentieth National Negro Health Week—As has become customary, the U. S. Public Health Service is sending out samples of materials for use in organizing local observances April 1-8, 1934. The official announcement says:

National Negro Health Week was initiated in 1915 by the late Booker T. Washington.

* Please address questions, samples of printed matter, criticism of anything which appears herein, etc., to Ewart G. Routzahn, 139 East 22d St., New York, N. Y.

It was not a birth, but rather an adoption. The Negro Organization Society of Virginia, with headquarters at Hampton Institute where then resided Maj. R. R. Moton, commandant, friend of Booker T. Washington, is the real father of Health Week. Dr. Washington sensed the capacity of this movement and appreciated its possibilities, and thus became the All-American champion of Negro health.

The announcement briefly reviews the development up to 1934 when 45 national or regional organizations, white or colored, unite in the call.

The program for the Week includes: Sunday, Mobilization Day; Monday, Home Health Day; Tuesday, Community Sanitation Day; Wednesday, Special Campaign Day; Thursday, Adults' Health Day; Friday, School Health Day; Saturday, General Clean-Up Day; Sunday, Report and Follow-Up Day.

Limited quantities of material will be supplied without cost, samples being sent to health agencies upon request. A dramatization of "The Daily Half Dozen" will be sent upon request. Address: National Negro Health Week, U. S. Public Health Service, Washington, D. C.

Quantity orders should be sent to Superintendent of Documents, Washington, D. C., for the following: poster, 100 for \$1.80; bulletin (with plans), 100 for \$1.40; leaflets for schools, 100 for 30 cents.

A Newspaper Desk Book—Most newspapers develop style or rules in capitalization, punctuation, and so on. In many cases this style is printed on a sheet or a pamphlet. In other cases it may be but a typewritten sheet posted in the city room. Other newspapers merely pass on the style from editor to reporters.

The *Iowa Newspaper Desk Book* is a compilation of the School of Journalism, suggested for use by Iowa newspapers, which says:

A newspaper usually develops a set of individual usages due to office necessities or the opinions, habits and whims of executives. Such development of the individuality of a paper is to be encouraged so long as it does not lead to unjustifiable and freakish eccentricity. . . .

There are many controverted matters in modern punctuation, capitalization and diction. This style book has had to record arbitrary decisions on all disputed points. Some of these decisions have been arrived at only after laborious study of authorities—especially that authority represented by the consensus of usage of the better newspapers.

Newspaper capitalization and punctuation is sharply divided from that of books. The "down style" of typography has won its way with the newspapers, and the end is not yet. The psychologists have shown us that lowercase letters read much more easily than capitals, and linotype operators have developed great increases in speed from the limitation of "caps." Likewise, it has been found that much of the nicely logical but "fussy" punctuation developed by the more pedantic is not necessary to clearness, and as a result the modern newspaper gets along very well with about half the volume of points used in book composition.

Among the chapters are those on reporting (of special value to those who write on health topics for newspaper use), capitalization, punctuation, abbreviation, figures, titles, spelling and division of words.

The health workers may well use this as a guide in writing copy, making note of standardized variations observed in the local newspapers. Issued by University of Iowa, Iowa City, Ia. 1933. 54 pages. 10 cents.

Public Health Education Section at Pasadena—The Section Council met as a program committee in New York, Feb. 3, with Chairman Shepard of San Francisco, and Secretary Connolly of Detroit among those present. An attractive and useful program was planned. It was decided to conduct a Health Education Institute which should be devoted to school health education.

"Carrying the Message to the People"—This is the happy title of a chapter in *A City Set on a Hill*, by C.-E. A. Winslow. In that review of the significance of the Syracuse Health Demonstration the twelfth chapter takes up the necessity for the health services having behind them "an aroused and intelligent body of public opinion" for "the people as a whole must comprehend the needs for such services and the value of such services" if those services are to be supported and if they are to be well utilized by the people.

Here Prof. Winslow outlines concisely the relationship of health education to the health program as a whole, plus three essential characteristics of satisfactory health education:

... it is now recognized that an organized program of popular health instruction must form a vital element in the general scheme of community health promotion. Such a program should be planned to bring to the people of the community the increasing knowledge of the principles of medical and sanitary science which they need to apply in their daily living, as individuals and as a group, for the attainment of maximum health and efficiency. It should utilize all the resources now available for disseminating information: the press, the platform, the radio, the cinema, the exhibit, the printed pamphlet, and the like. In so doing, it must keep three conditions always in view. It must bring to the people only what is established on a sound scientific basis. It must present its facts with the most effective technic, as to selection of content and form, so as to make the essential facts clear and to arouse an effective desire to apply them. And, finally, the program must be so planned as to emphasize those things which are vitally important and to do so at the times and under the conditions where application of the principles in question can most easily and effectively be made.

In the light of the above the most significant statement in the chapter is the following, which we put into italics that none may overlook it:

To attain such objectives as these clearly requires definite and specific leadership by persons with special train-

ing in the technic of presentation. If the modern health program is to bear its fullest fruit, the Health Department must have a special division of popular health instruction under the direction of a trained specialist in this field.

We count upon this chapter as a whole being widely read by public health workers who will so generally wish to study the Syracuse experiment through the eyes of Prof. Winslow. Briefly, the chapter takes up the need for organized health instruction; development of popular health instruction in Syracuse; the Bureau of Health Education of the Health Department; the Onondaga Health Association; community planning; appraisal and costs of popular health instruction.

There are frequent references to a "program of health education" but there is little light on what that program was, on what it was based, or how it was arrived at. Is it not natural for the reader to make the obvious deduction that the program is made up largely of the materials and activities which occupy much of the chapter?

A program or a plan for health education, as we see it, is not the planning of the details of a particular project or event. Rather we are thinking of a plan or program for a year or other extended period. It is the selection of the objectives and the chief audiences and mediums mapped out in relation to the needs of the community and the resources of the health agency, or the group of health agencies.

Unhappily, the appraisal form does not call for a program or plan, and none of the health survey reports, as we have seen them, record the lack of a program, or propose one for the future. Hence the disappointment that in *A City Set on a Hill* there is not described a broad, solid base of program planning for the admirable health education activities presented in this chapter.

A City Set on a Hill is published by

Doubleday, Doran and Co., Garden City, N. Y. 382 pages. \$3. Order from A.P.H.A. Book Service.

"Health Exhibitions" — by J. Mackintosh (*Mother and Child*, 5 Tavistock Square, London, W. C. 1. July, 1933. 9d. a copy), mentions that

In the history of public health during the present century, the contribution of the health exhibit has been of incalculable value. Long before the War small exhibits had been shown from time to time in connection with courses of lectures on hygiene.

Mr. Mackintosh traces the holding of the successive large-scale exhibitions in connection with National Baby Week, and the development of the exhibition idea by the National Council of Maternity and Child Welfare.

The Council maintains a permanent exhibition at Carnegie House, 117, Piccadilly, London, W. 1., illustrated in connection with the article, to be noted on the itineraries of health workers from other countries. The Council is a continuous source from which many traveling exhibits are sent throughout the year.

Local Clinics on Amateur Movies—Health councils have received from Social Work Publicity Council a suggested plan for demonstration and clinic sessions on the use of amateur motion pictures. A copy of the plan will be sent to any one interested in the use of home-made pictures by health and welfare groups.

The Council has issued a "List of Amateur Motion Pictures" which may be drawn upon in planning a local demonstration. Send 6 cents to Social Work Publicity Council, 130 East 22d St., New York, N. Y.

From these memoranda we quote the following on "What Is An Amateur Movie":

The term is elastic for the purposes of this memorandum. It covers any picture not

wholly or primarily a professional production.

The photography may be done by a staff member—by a board or committee member—by an amateur movie volunteer—even by a professional photographer (as has been done in a few cases).

Common to all amateur pictures is the 16 mm. non-inflammable film, usable in projectors without a booth.

The amateur picture is not bound by conventions of theatrical production, nor hampered by visions of the theatrical audience. As a rule it is intended for a more intimate presentation, although modern 16 mm. projectors permit successful screenings up to 500 in the audience. Drama or plot is not essential, but effective continuity is an important element in the successful picture. (Valuable assistance in planning the continuity may be secured from Amateur Cinema League, 105 West 40th St., New York, N. Y.) Advance planning before production is of paramount importance in achieving effectiveness in an amateur picture. The available equipment makes poor photography inexcusable.

Getting Books Read—Probably we have done too little in promoting the use of our public health journals. Equally important, and probably more difficult to carry through, is the wider use of supplementary sources for health workers, physicians, and other groups.

The National Tuberculosis Association

is experimenting with the use of a package library for physicians. The library is designed especially for use at medical meetings, selected clinics where physicians have time to look over books, at medical libraries and so forth. Arrangements may be made with the National Tuberculosis Association for the loan of the library. There is no charge for the books but the borrower must pay the transportation charges both ways. The package weighs approximately 20 pounds.

The Brooklyn Tuberculosis and Health Association, 293 Schermerhorn St., has assembled a "Minimum Tuberculosis Library for Physicians" which is thus described:

This abbreviated shelf of books covering all phases of Tuberculosis represents what may be called a minimum library that every physician, whether in general or specialized practice, should either own or to which he should have easy access.

Health Education in Indiana—

Health education work in Indiana is now being carried on under the supervision of the Indiana University School of Medicine and the state and local medical associations. In this set-up the Bureau of Health Education in the Division of Public Health acts as a contact medium between the lay public and the medical profession, helps plan health programs and campaigns, secures speakers, provides health films, literature, exhibits, etc. This service and material is furnished without cost.

To receive the coöperation of the Bureau, any group wishing to put on a health program must first secure the approval of the local medical society through its secretary. This approval is absolutely necessary.

The next step is to inform the director of the Bureau, giving him ample time, as to the date, hour and place of the proposed meeting and the subject of the talk, films, or exhibit desired. The Bureau will then make the necessary arrangements. If the local medical society prefers, a speaker from outside the community may be secured, but as a rule local physicians are ready and willing to fill these engagements.—

Echoes, State Bureau of Public Health Nursing, Indianapolis.

A Compliment from North Carolina—A marked copy of *Health Bulletin*, North Carolina State Board of Health, comes to us carrying a two-thirds of a page quotation from this department of the *Journal*.

DEPRESSION

The references under this heading may supply background material for writers or speakers. Some of the references may be useful to officials or to relief and family welfare agencies—if passed on to them.

"Economic Aspects of Present-Day Health Problems," by W. W. McFarland, M.D., *Pennsylvania's Health*, State Dept. of Health, Harrisburg, Pa. Nov.-Dec., 1933. Taxpayer's viewpoint plus necessity of maintaining standards. "Sickness Among the 'Depression Poor,'" by Perrott and Collins. *American Journal of Public Health*. Feb., 1934.

"Sickness and the Depression," by Perrott and Collins; and "Diets of Low-Income Families in Cleveland, Detroit and Syracuse," by Wiehl. *Quarterly*, Milbank Memorial Fund, 40 Wall St., New York, N. Y., Jan., 1934. 25 cents. The first is a "preliminary report upon a survey of wage-earning families in Baltimore, Cleveland, and Syracuse.

"Youth Never Comes Again," by Clinch Calkins, is for those who are concerned about the excessive free time of present-day young people, and those who want to do something about it. There is the definite suggestion that "health and hygiene groups (public and private)." are among those interested in a program of adult education. 71 pages. 25 cents. Committee on Unemployed Youth, 450 7th Ave., New York, N. Y.

"Idleness and the Health of a Neighborhood" is one of those rare studies for which a previous study made in 1922 provided "a background of fairly normal conditions against which the disruption of health and economic life during the depression years stands out sharply." This study was made by G. H. Berry, and published by New York Association for Improving the Conditions of the Poor, 105 East 22d St., New York, N. Y. 102 pages. Diagrams and tables. \$1.00.

"The Importance of Milk in Relief Diets" is a 3-page review of recent discussion, with a half dozen reading references. National Dairy Council, Chicago. Free.

BULLETINS

"The Handicapped" is the general theme of the Oct.-Dec., 1933, issue of *Commonwealth*, Massachusetts Dept. of Public Health, Boston. 111 pages, to which is added a 6-page index for the 4 issues of the year.

Health News, New York State Dept. of Health, Albany, N. Y., appears in

a brand new dress. Get a copy and see it for yourself.

A special milk number of *Canadian Public Health Journal*, published by Canadian Public Health Assn., devoted 52 pages to a variety of topics from the farm and the home, and the problems and procedures along the way to safe and wise use of milk. Jan., 1934. 105 Bond St., Toronto, Ontario. Reprints, 35 cents.

EDUCATION AND REFERENCE

Here are listed publications for background in writing and speaking, for intensive use with especially selected individuals, or for more general use in the community.

Another booklet issued by Cancer Control Committee of Dept. of Health, New Haven, Conn., carries on its front cover the rugged heights of cancer mortality expressed in a solid diagram, this time in purple. The illustration "bleeds" over the left, right, and lower edges of the page. "Cancer," appears as a title set in the upper white space section.

"Asphyxial Death" is a one-page copy of an editorial comment in the *Journal* of the American Medical Assn., reproduced on a cover-page of the *Journal*. Illustrates use of the off-set process when one wishes to tie-up the authoritative journal with a clipping. Society for the Prevention of Asphyxial Death, 2 East 103d St., New York, N. Y. Send 3 cents postage.

"Cancer—A Challenge," by Shields Warren. A. M. A., 535 North Dearborn St., Chicago. 9 pages. 10 cents.

"For Good Health," a poster, mostly a well lettered placard. A simple food selection guide. Metropolitan Life Insurance Co., New York and Ottawa. Free.

"How to Gain Weight: It Is Important for Some to Know," by Laura A. Miller. A. M. A., 535 Dearborn St., Chicago, Ill. 9 pages. 5 cents.

"Maternal Deaths," by Children's Bureau, Washington, D. C. "Brief report of a study made in 15 states." Superintendent of Documents, Washington, D. C. 5 cents.

"The Partial Conquest of Heart Disease," by D. B. Armstrong, M.D. Metropolitan Life Insurance Co., New York, N. Y. Free. Reprint from *American Medicine*.

"The Practice of Preventive Medicine by the Private Practitioner," by Iago Galdston, M.D., New York Academy of Medicine, 2 East 103d St., New York, N. Y. 15 pages. 10 cents. Reprint from *Health Examiner*. Includes an interpretation of the periodic health examination.

"Tuberculosis—A Family Disease: Social Aspects," by Edward Hochhauser, Committee for Care of Jewish Tuberculous, 71 West 47th St., New York, N. Y. Reprint from *Transactions of National Tuberculosis Assn.*, 1933. "An increasing percentage of our tuberculous patients discharged from hospitals and sanatoria can be rehabilitated through greater interest in the family method of treating the patient." Send 3 cents postage to the author.

"What Builds Babies?" Revised, 1933. Children's Bureau, Washington, D. C. Single copies free. 8 pages. "The mother's diet in the pregnant and nursing periods."

HONORABLE MENTION

To Department of Public Health, Union of South Africa: for full table of contents in annual report.

To State Board of Health of Maryland: for Annual Report with both table of contents and index. Quite detailed index taking 19 pages of the 235-page report; with references to health education in Letter of Transmittal, and reports of Bureau of Vital Statistics, Bureau of Child Hygiene, and Division of Oral Hygiene.

TO DO OR TO USE

"Friendly Messengers Carrying Lessons of Health," by Mary P. Connolly. How the Detroit Health Dept. and Detroit Chapter of the Red Cross reach the local Negro population. *Red Cross Courier*, Washington, D. C. Dec., 1933. 20 cents.

"Health Recovery Campaign," in "Public Health Administration" section, *American Journal of Public Health*. Feb., 1934. With illustrations of materials for use in the 1934 Early Diagnosis Campaign.

In "Health Examinations," by M. A. Lundwall (*Womans Press*, 600 Lexington Ave., New York, N. Y. Feb., 1934. 20 cents), is a reminder of educational use to be made of record data:

When a comparative study is made of the 3 years' examinations some interesting conclusions may be announced, such as the effect of economic stress on general health; the influence health teaching has had in the change of health habits. At present, the health and physical education program must be worked closely together if the individual is to attain that joy of living which comes from practising health habits intelligently.

Snapshots at night are now possible with a new supersensitive film, taken with the aid of two or three of the photoflood bulbs. The film has three times the speed of ordinary film under ordinary light.

MOTION PICTURES

For advance information about dates for "Damaged Lives" at your local motion picture house address: American Social Hygiene Assn., 450 7th Ave., New York, N. Y.

A new folder "Facts—Results" tells in striking fashion about the reception given to "Man Against Microbe," the motion picture of Metropolitan Life Insurance Co., New York and Ottawa. *Free*.

"This business of continuity" explains the significance of "continuity" in the production of motion pictures.

"Clipper explodes" shows how to handle negative to produce continuity. "Weaving a magic carpet" discusses travel pictures, but much of it applies to pictures of health camps, classes and institutions. "The formula needs no magic—only careful planning." All in *Movie Makers*, 105 W. 40th St., New York, N. Y. Oct., 1933. 25 cents.

RADIO

John McCormack, in an interview on broadcasting, in *New York Times*, Dec. 3, 1933, said:

The English . . . seem to have discovered the knack of making abstruse subjects clear, interesting and entertaining. American broadcasters should concentrate on more speakers who devote their talents to presenting interesting topics in a popular style.

"The Drug and Beauty Racket." *Education by Radio*, National Committee on Education by Radio, 1201 16th St., N. W., Washington, D. C. Racketeering via Radio. *Free*.

Health by Radio is a 155-page, paper-bound book, reporting "the sixth hundred of a series of health talks broadcast every Friday night by the New York State Dept. of Health from Station WGY." From the introduction:

Over 10 years have passed since the Division of Public Health Education of the State Department of Health, began broadcasting health information from Station WGY, Schenectady, through the courtesy of the General Electric Company.

There is no way of estimating the amount of human suffering which has thus been prevented or alleviated. The advice and suggestions given by the authors of these talks must have resulted, however, in a far better general understanding of basic facts relating to health and disease.

Individual copies of any of the broadcasts contained in this booklet can be obtained by writing to the Division of Public Health Education, State Department of Health, Albany, N. Y.

In June, 1933, *Hygeia* carried a devastating article on "The Radio Gymnasium Class," by Alfred C.

Boand, 'self-confessed leader of radio classes. After a thorough deflation the author proceeded to reflate and stabilize the radio gymnasium class on the basis of certain definite specifications. The article makes good reading for those who like *American Mercury*. In Oct., 1933, *Hygeia* published an answer from Dr. Jesse Feiring Williams of Teachers College, an interpretation of modern physical education vs. the radio class.

SOCIAL HYGIENE

"Attitudes and Practices of Parents in Sex Education of Children," by M. S. Dillon. *Journal of Home Economics*, Baltimore, Md. Dec., 1933. 30 cents. In this study ". . . the second outstanding finding, and probably the most important, was the amazing inconsistency shown by the parents between their opinions, so enthusiastically and sincerely expressed, and their practices."

"Fight Venereal Diseases with Knowledge." City Health Dept., Baltimore, Md. 8 pages; heavy paper; pictorial cover. The needed knowledge about the three venereal diseases.

"Social Hygiene Exhibit Screen." American Social Hygiene Assn., 450 7th Ave., New York, N. Y. Free. A small folder illustrating and describing a 3-wing display screen, with 19 samples of publications. Screen is sold, or loaned for transportation cost.

"The Wonderful Story of Life," New York State Dept. of Health, Albany, N. Y. 24 pages. Parents' talks to be read or told to young children.

From "Social Aspects of the Venereal Disease Problem in Canada," by F. S. Parney, M.D. *National Health Review*, Ottawa, Ont., we glean the following:

In the war against venereal disease others than the psychologist have parts to play. The physiologist must prepare for the guidance of parents and the laity in general, a plain, simple, but comprehensive statement of scientific facts regarding the physiology of sex, just as he has done in the past with re-

gard to the physiology of digestion, assimilation and excretion of food materials.

The educationist, either through the department of health or voluntary health and mental hygiene organizations, must get this information over to the public in such a matter-of-fact way that it will become part and parcel of the individual's idea not only of personal hygiene but also of his normal social adjustment.

WANTED!

We have been asked for information about adult or popular health education programs.

Please send copies of office memoranda, reports, or other material to editor of this department.

Have you a program of adult or popular health education for your city, county or state?

Have you an article, a convention paper, or other material discussing such programs?

REPORTS

The "Annual Report" of American National Red Cross (Washington, D. C.) for year ending June 30, 1933, as usual includes a helpful device. At the head of many of the service chapters is an explanatory paragraph. For example: under "Public Health Nursing and Home Hygiene" appears the following:

The Public Health Nursing Service spreads knowledge of healthful living and coöperates with health authorities and the medical profession in checking the spread of disease. Home Hygiene and Care of the Sick gives practical instruction in infant and child care and in home care of the sick and develops correct attitudes toward health and disease.

From the Annual Report of Royal New Zealand Society for the Health of Women and Children:

The Society was started as a League for mutual helpfulness and mutual education, with a full recognition of the fact that, so far as motherhood and babyhood were concerned, there was as much need for practical reform and "going to school" on the part of the cultured and well-to-do as there was on the part of the so-called "poor and ignorant."

MAGAZINE ARTICLES

"I Read That in a Magazine" introduced the following:

This publicity slogan is the basis of our policy of reporting what current magazines are saying about social problems and social work. What your magazine reading public is being told builds up a degree of acceptance or resistance to your own publicity. Even though the articles may not bear directly on your own work, they help create a frame of mind in which social work information takes a more important place. Some of these articles may be overlooked by your public unless you call attention to them. There is another reason, or we might call it a hope, connected with our reviews—that now and then some of our members will write at least as much as a postal card of appreciation to the editors, when their articles interpret social work well.—

News Bulletin, Social Work Publicity Council, 130 East 22d St., New York.

So say we for this section of "Education and Publicity." Many of the articles here listed during the year contain quotable material for speakers and for other uses. The articles also suggest angles or slants of approaches for making old stuff fresh and interesting.

"A Diet Lesson from the Arctic," by K. Glover. *Herald-Tribune Magazine*, New York, N. Y. Jan. 28, 1934. Pre-packed daily balanced rations.

"A New Approach to Sex Education," by C. Pilpel. *Delineator*, New York, N. Y. Oct., 1933. 10 cents. "Delineator has paved the way with fearless discussions on this subject."

"Why Die Before Your Time?" by H. S. Williams, M.D. *Collier's*. Jan. 13, 1934. "It's a silly thing to do . . . but most people are, or will be guilty."

SAFETY

"An Auto Sherlock Holmes," by F. M. Kreml. New York *Herald Tribune Sunday Magazine*. Dec. 31, 1933. How the Evanston police catch and convict traffic law violators.

"Blind Drivers with Good Eyes," by

Dr. C. E. Pollard. *Kiwanis Magazine*, 520 N. Michigan Ave., Chicago, Ill. Dec., 1933. 15 cents. Mental factors and eye habits which produce car accidents. Something to do something about.

"Industrial Hygiene and Safety," Metropolitan Life Insurance Co., New York, and Ottawa, Ontario, briefly defines "industrial hygiene" and "industrial safety," and then explains the publications and other services offered by the Metropolitan. 24 pages. Free.

SCHOOLS AND CHILDREN

The entire Oct. 15, 1933, issue of *Health Briefs* is devoted to the "Blue Ribbon Program" in the schools of Tennessee, promoted by the State Dept. of Public Health, Nashville.

Any child is eligible to receive a Blue Ribbon when evidence is shown that he (a) is making satisfactory progress in his studies; (b) is amenable to the ordinary requirements of school discipline; (c) is reasonably cooperative in the practice of health habits; (d) is free of remediable physical defects and meets certain immunity standards. Immunization standards include protection against typhoid fever, diphtheria and smallpox.

"Health Instruction in Grades IX-XII," by J. F. Rogers, Office of Education, Washington, D. C. Sold by Supt. of Documents, Washington, D. C. 5 cents. From "Theory and practice" to "College credit." 22 pages.

"Teaching Health in School Cafeterias: Baltimore's Poster Program." *Trained Nurse and Hospital Review*, 468 4th Ave., New York, N. Y. Oct., 1933. 35 cents. Illustrated description of visual material for stimulating wise food selection.

"Your Child and the School" is a series of 10 newspaper articles by Dr. Allen G. Ireland, director of physical and health education, N. J. State Dept. of Public Instruction. Mats supplied free by Health News Service, 22 East 40th St., New York, N. Y.

BOOKS AND REPORTS

Report to the United States Government on Tuberculosis with Some Therapeutic and Prophylactic Suggestions—*By S. Adolphus Knopf, M.D. Revised and Enlarged Report submitted to the State Department, War Department and War Veterans Bureau as Government Delegate to the International Union Against Tuberculosis Held at the Hague, Sept. 6-9, 1932. New York: The National Tuberculosis Assn., 1933. 59 pp. Price, \$1.15.*

Dr. Knopf's lifelong interest in tuberculosis, his command of languages, his wide training and familiarity with European as well as American conditions, make him singularly fitted for the task on which he here makes a report. Of particular interest is his observation of the use of sanocrysin, but in view of the contradictory evidence reported by Dr. Knopf, we still remain unconvinced. We commend his final paragraph in answer to Professor Bernard, who claimed recovery or notable improvement in some 50 per cent of the cases treated with sanocrysin, in which he points out that by hygienic and dietetic methods, clinical recovery or notable improvement in 50 per cent or more cases is obtained.

The second chapter is devoted to the after-care of tuberculous subjects. England has its notable tuberculosis villages, such as Preston Hall and Papworth. Germany has tried to found establishments, but up to the time of this report, there were no institutions for tuberculous war veterans. France has created a Sanitary City, which Dr. Knopf thinks will do much good. It is evident that the United States is doing better by its veterans than any other

country, as there are now 14 hospitals for the care of tuberculous veterans, as well as other public facilities, in addition to which we have a number of private and state institutions.

The author gives a full description of his respiratory therapy or diaphragmatic respiration, which has attracted much attention. Preventive inoculation with BCG is considered favorably. The last chapters are largely given up to the prevention of tuberculosis in children by breathing exercises, outdoor life, etc.

The book is abundantly and beautifully illustrated, the frontispiece being a photograph of the Queen Mother of the Netherlands, who was Patroness of the Conference at the Hague. There are photographs of the institutions in England and elsewhere, and a full series showing respiratory exercises.

The report can be recommended as a record of the observations of an interesting trip emphasized by important conferences and visits to war veterans hospitals made by an enthusiastic and competent specialist in tuberculosis.

MAZÏCK P. RAVENEL

The Human Problems of an Industrial Civilization—*By Elton Mayo. New York: Macmillan, 1933. 194 pp. Price, \$2.00.*

This volume proceeds at once and without introduction to its subject matter, comprising eight chapters: I. Fatigue, II. What is Monotony? III. The Hawthorne Experiment, IV. Development of the Western Electric Inquiry, V. The Meaning of "Morale," VI. The Reaction of Industry upon the Social Order, VII. Theories of Government and the Social Order, VIII. The

Problem of the Administrator—especially the new administrator.

Excerpting much literature as a *basis argumenti*, particularly in the earlier chapters (the author index lists several citations from most of its 65 sources), the author develops his own special field in the later chapters.

There is a tendency to lengthy quotations, repetition, and verbosity, and some may wish that a summary had been provided for each chapter, but the concluding chapter is of summarizing type. Fault may also be found in omitting references to other works of the same tenor such as Frankel and Fleischer's *Human Factor in Industry*, and the findings and efforts of the Life Extension Institute and its former medical director, Dr. Eugene L. Fisk, likewise the annual reports of the Committee on Fatigue of the Industrial Hygiene Section of the American Public Health Association. However, the literature cited is widely selected and authoritative.

The practical applications made at the Hawthorne Plant of the Western Electric Company make very instructive reading; after all, there is always the individuality, the psychology and the group response of the human being to be considered.

We think the author missed it in his implied prophecy (p. 184) wherein he discusses the abandonment of the gold standard in England with so little local (English) excitement, and asks whether such a step in the United States would have so little effect, or "cause no visible tremor in the social life of the country?" The remark was made just prior to our own abandonment of the gold standard (and whatever "tremor" this did cause).

The book represents the author's contributions to the Lowell Lectures given in 1933, and embodies some conceptions of the methods and findings of several groups of workers at Harvard

University in their industrial investigations. The concluding dogma is, collaboration based upon the coherent unity of biochemical, medical, industrial, and anthropological factors in the perfection of our industrial civilization—certainly an ideal concept and masterfully handled in the present work. The book will interest all who have to do with employee problems.

EMERY R. HAYHURST

Red Medicine: Socialized Health in Soviet Russia—By Sir Arthur Newsholme, K.C.B., M.D., and John Adams Kingsbury, LL.D. New York: Doubleday, Doran, 1933. 324 pp. Price, \$2.50.

The descriptive phrase, "Sketch of Medical and Public Health Administration in Soviet Russia," which is found in the Introduction, admirably characterizes this very readable book.

Sir Arthur Newsholme's earlier report for the Milbank Memorial Fund, *International Studies on the Relation Between the Private and Official Practice of Medicine, with Special Reference to the Prevention of Disease*, did not include a study of Russia. It was later decided that an investigation of Russian medico-social problems would be of benefit, and this book represents the result of an extensive, though brief, trip through Russia for such purposes. Adequate introductions, special conferences, with a background of reading and direct inquiry afforded the authors an unusual opportunity for obtaining accurate information.

Approximately the first half of the book is taken up with a diary-like outline of the trip which led from Moscow and Leningrad through Georgia, the Crimea, the North Caucasus, the Black Sea area, and the Ukraine, and general information regarding Russia's early government, the industrial and agricultural situation, and civil and home life. All this is included in order to give

the reader a proper appreciation of the latter half of the book which records a statistical and critical survey of medical conditions. This section includes chapters on such subjects as care of children and mothers, abortions, social insurance, public health work, medical training, care of the sick, control of tuberculosis and venereal diseases.

Every doctor in Soviet Russia is a state official with regulated salary; every individual a state responsibility. A doctor may choose his location for practise, may practise privately after his daily duties to the state are finished, and he may specialize after qualifying by special examination. While the standards of medical education are lower than in this country, they are improving. More women than men are now practising, and there is no sex discrimination.

The individual may choose his doctor within his district. If he is sick and unable to leave his home he is visited by a doctor. Whenever it is possible he is made to go to a neighborhood dispensary and is then sent to a central polyclinic or hospital. In most cases there is no fee. As an individual, a woman may decide the question regarding abortions after the first pregnancy; the state regulates the procedure. Prenatal and postnatal care are supplied, and state care of children is free to the working mother.

There are many rest and convalescent homes and sanatoria, chiefly for tuberculous patients. Adequate provision is made for the control and treatment of venereal diseases.

The good and bad points of this system of socialized medicine are evaluated by the authors with an attempt to predict the future. It is obvious that they consider it a most interesting experiment, worthy of extension.

The book is a valuable summary of information much of which has previously appeared in magazines and books.

The medical reader will wish that the first half had been reduced and the second half given more extensively. As a "Sketch" it is recommended to all.

ANNA DEAN DULANEY

Diseases of the Heart—By Sir Thomas Lewis, M.D. New York: Macmillan, 1933. 297 pp. Price, \$3.50.

This well written book carries out essentially what the author states in the preface as his intention; viz., simplicity in teaching. It does not pretend to be a treatise upon all the phases of cardiac pathology, and much in the way of theory has been left out. The classification of the diseases of the heart is necessarily anatomical in certain instances, yet the physiological viewpoint is always borne in mind. The author in his discussion keeps before the reader the idea of Sir James MacKenzie—to use one's own special senses and sound clinical observation as a means of diagnosis. The use of the electrocardiograph is not emphasized, though it is by no means deprecated. Where it is necessary to make a point clear, electrocardiograms are used. All the while, the needs of the man in general practice who may not have at his disposal elaborate mechanical aids, is kept in view, and the author gives in a very clear manner the points which he wishes to make.

The use of elaborate and many times confusing technical terms is avoided. Of special interest are the chapters on cardiac failure, coronary thrombosis, and angina.

One chapter given to the discussion child-bearing, anesthetics and operations, is especially timely, as very few authors take the trouble to consider these subjects except in the most casual manner. His discussion of these subjects is most helpful to the general practitioner.

This book can be recommended to every physician whatever may be his

specialty, for heart disease in one way or another touches every field of medicine. It supplies the need for the one who wants accurate, well classified information in a hurry and who does not wish to have it cluttered with nonessential details.

The book is well printed and put together. The illustrations, though not very abundant, are excellent.

EDGAR D. BASKETT

Annual Report of the Surgeon General of the Public Health Service of the United States for the Fiscal Year 1933—*Washington: U. S. Government Printing Service, 1933. Price, \$0.75.*

This report is shorter than usual. It is known that funds have been cut and personnel reduced, with the necessary curtailment of activities. However, the report is encouraging.

The report begins with a review of world health conditions which necessarily affect us, though we have been fortunate through our quarantine service in keeping epidemic diseases from our shores. Plague continues to be the most imminent menace of all diseases. India had 38,000 deaths from plague in 1932, an increase of about 10,000 over 1931. Typhus fever has been somewhat prevalent in Mexico, and an outbreak of some 955 cases has occurred in this country, confined largely to 3 southern states which recently took up the extensive culture of peanuts.

In the United States the health conditions have been good, the general death rate for 1932 being the lowest ever recorded, and those for tuberculosis, diphtheria, and typhoid fever have also reached new low records. There were some increases in the death rate from the degenerative diseases, such as cancer, heart diseases, etc.; but this is only a continuance of what has been happening for some years. In

spite of the distressing economic conditions, unfavorable results have not yet become apparent in the crude death rate, though it has been shown that there is increase of illness among the unemployed, whose economic condition is therefore below par.

The infant mortality has decreased. In 1915, 1 infant out of every 10 born died in the first year, while in 1932, only 1 out of every 17 died. Against this, the birth rate has continued to decline, being now 17.3 per 1,000 population.

Smallpox has decreased, but is still one of the blots on our record. More than 400 cases of cholera were reported in the Philippine Islands, but it did not reach this country. Rocky Mountain Spotted Fever continues to be a menace in the Rocky Mountain and Pacific States, and 103 cases, with 10 deaths, were reported on the Atlantic seaboard. Pellagra has decreased from 7,074 deaths in 1924 to 4,091 in 1932, but many health officers anticipate an increase due to poor economic conditions. Undulant fever continued to attract attention, 1,502 cases, with 71 deaths, having been reported in 1932.

The usual quarantine service has been carried on efficiently, 10,935 vessels having been inspected on arrival at domestic ports, and 2,982 at insular ports, while in foreign ports, 179 vessels were inspected before sailing. An interesting feature and one that is comparatively new, is the inspection of airplanes, 4,186 of which arrived at air ports from foreign lands, carrying 25,767 persons. Owing to the lack of personnel, 1,977 entered without the examination required by law. Inspection of airplanes failed to reveal the presence of any disease-bearing mosquitoes in those which had been sprayed during the flight with an oil extract of pyrethrum flowers, though experiments have shown that planes could

and did carry such mosquitoes alive when this precaution was omitted.

During the year a beginning was made on two narcotic farms, one at Lexington, Ky., and one at Fort Worth, Tex.

The Service has moved to its new building on Constitution Avenue and 19th Street, N. W. An interesting history is given of the housing of the Service since its establishment in 1798. Among important matters in which results have been achieved are those on malaria, in which county-wide dusting at 21-day periods has been carried out in an effort to suppress the disease. Studies have also been made on plasmochin and atabrin, the latter of which have been extremely promising. It seems to be superior to quinine, acting somewhat more quickly and without discomfort to the patient. In coöperation with the State Hospital for Insane, Columbia, S. C., Dr. Mayne has established strains of benign tertian, quartan, and a relatively mild strain of estivo-autumnal malaria. Shipment of live mosquitoes and blood as well as sporozoites from the salivary gland has been carried out successfully.

The Service has carried on extensive studies on hemolytic streptococci and has developed a streptococcus toxoid for immunization against scarlet fever which has been successful in a series of 3 doses in over 80 per cent of 1,700 persons. Diphtheria studies have been continued, and it is announced that the alum precipitated toxoid in a single dose of 1 c.c. is at least as effective as 2 doses of 1 c.c. each of the original unmodified toxoid. It seems entirely probable that this treatment will supersede other prophylactics. Altogether, the report is encouraging, and should be read by health officers and those interested in the state of the public health.

MAZÛCK P. RAVENEL

Outline of Immunity—By W. W. C. Topley, M.A., M.D., F.R.C.P., F.R.S. Baltimore: Wood, 1933. 416 pp. Price, \$6.00.

This book does much to remedy the unsatisfactory position of Immunity as a subject, to which the author refers in the preface. It is a systematic and condensed presentation of an immense amount of material. While a considerable proportion of the printed contents and illustrations have already appeared in *The Principles of Bacteriology and Immunity*, written by the author and his associate, Professor Wilson, these parts have been revised and either condensed or extended. In the present form the book serves as a specialized text for the advanced student, with a sound foundation in clinical bacteriology. It is in no sense a reference book to be recommended to the beginning student.

The contents, which cover thoroughly the field of immunological interest, include discussions of infection, the mechanism of bacterial invasion and varied defenses of the host, the antigenic rôle of bacteria, with a consideration of their chemical make up, herd immunity, virus immunity. Especially clear are the accounts of the responses of bacteria to the defense mechanisms of the host and the origin of natural antibodies.

Four chapters of the book deal with the practical application of immunity in diagnosis, in prophylaxis, and in treatment, and the standardization of immunological reagents.

At the end of each chapter a concise summary of the important points is given in numerical order with the list of references following.

The term "mechanism" is a favorite one with the author, and data are critically considered from this point of view. The facts are impartially stated and while the author in no way evades

personal opinions, these are given in manner devoid of dogmatism.

The general make up of the book is pleasing. It offers sufficient "reason" for having been written.

ANNA DEAN DULANEY

Industrial Health Service—By *Leverett Dale Bristol, M.D., Dr.P.H., Health Director, American Telephone and Telegraph Co. Philadelphia: Lea & Febiger, 1933. 170 pp. Price, \$2.00.*

This handy little book is all that its name implies. It presents in a condensed form the more important facts with reference to the health of workers in industry, and these from three standpoints—the management, the supervisor, and the individual himself. The book is accordingly divided into three parts with brisk, short chapters composing each.

While there are no illustrations or formal tables, there is a good index as well as two appendices carrying appraisal forms, the one for smaller industries and the other for personnel and industrial relation services in general.

It is interesting to note that a suggested appraisal form for industrial hygiene was presented to the Committee on Standard Practices of the American Public Health Association some years ago, but, so far as the reviewer knows, this is the first attempt to give definite form to such an idea after a presentation of some parts of it to the Section on Industrial Hygiene (at the Washington Meeting in 1932).

Examination of the substance matter of various chapters shows that the work is quite up-to-date, quite in keeping with the best thought, and something which those interested in industrial health efficiency should be glad to have available for ready reference.

EMERY R. HAYHURST

Contagious Diseases—What They Are and How to Deal With Them—By *W. W. Bauer, M.D. New York: Knopf, 1934. 218 pp. Price, \$2.00.*

This book written for the layman deserves more than usual commendation. It is easily understandable to the average mother for whom it is written specially. The last part of the book is not so good as the first. In our judgment, there are two outstanding faults: Toxin-antitoxin is still mentioned, and there is no mention of alum precipitated toxoid, although this is on the market and bids fair to supersede all other preparations, and certainly toxin-antitoxin. The second criticism is that the treatment of prevention of tuberculosis is entirely inadequate. There is practically no mention of the danger of bovine tuberculosis to human beings, though it is universally recognized not only as a cause of death, but a still greater cause of disability.

The book is well written and well printed, and we hope for it a wide circulation.

MAZÛCK P. RAVENEL

Behind the Doctor—By *Logan Clendening, M.D. New York: Knopf, 1933. Price, \$3.75.*

Many readers of newspapers will recognize the author of this book as the writer of daily health articles which are familiar through the pictures of Dr. Clendening which always accompany them.

The same type of readers will find this book interesting and instructive for it has been written for the layman. Scientific facts are there, but these are greatly embellished by fictional dialogue and a gossipy style that will lead the layman to believe that scientific discoveries and medical advancement are veritable romance, that the men concerned were very human creatures.

The author justifies the fictional form by the expressed belief that medical discoveries in the form of straight historical narrative would not appeal to the type of reader for whom the book is intended. The sprightly conversation, the intimate glimpse into personal lives are either "extracted from their own writings or are reasonable deductions from those writings of what the character would have said." In any event, it is a rather gay account of the many discoveries and tremendous background of knowledge which goes into the making of the present-day doctor.

There is a brief account of the beginnings of medical knowledge—the medicine man with his final displacement by the fathers of modern medicine, Hippocrates and Galen. Then follow sections dealing with the early development of the fundamental sciences, anatomy and physiology, and the resulting influences in treatment of disease; preventive medicine and vaccination, the entrance of laboratory examinations into medicine, the development of modern medicine and surgery, and the progress of all branches of medicine since 1900.

A bibliography giving references for

each chapter, and citing the places where the writer has "wandered without guidance or authority," closes the book. There are numerous photographs and original drawings which add to the attractiveness of the epic.

The book is without doubt very interesting and much real information may be obtained. The style is more interesting while reading page 1 than when pages 200 or 300 are reached, by which time it seems a trifle facetious and too "popular."

The subdivision of the chapter on Preventing Plague and Pestilence headed "The Dear Little Boy" turns out to be an account of Edward Wortley Montagu, Jr. Oliver Wendell Holmes's appreciation of the many sources of medical knowledge is elaborated upon in chapters describing, "What Medicine Learned from a Sailor," "What Medicine Learned from an Old Market Woman," "What Medicine Learned from a Postmaster," "What Medicine Learned from a Singing Master."

The book is beautifully gotten up, with heavy paper and good type. As a dramatized account of medical progress in very readable form it is recommended.

ANNA DEAN DULANEY

BOOKS RECEIVED

OUR COMMON ENEMY: COLDS. By Editors of "Fortune." New York: McBride, 1934. 102 pp. Price, \$1.00.

BLINDNESS AND THE BLIND IN THE UNITED STATES. By HARRY BEST. New York: Macmillan, 1934. 714 pp. Price, \$6.50.

ALCOHOL. ITS EFFECTS ON MAN. By Haven Emerson. New York: Appleton, 1934. 114 pp. Price, \$1.00.

HEALTH EDUCATION IN AN AMERICAN CITY. By Louise Franklin Bache. New York: Doubleday, 1934. 116 pp. Price, \$2.00.

PEDIATRIC NURSING, INCLUDING THE CARE OF THE WELL INFANT AND CHILD. 3d ed. By Gladys Sellev. Philadelphia: Saunders, 1934. 609 pp. Price, \$2.50.

HEALTH THROUGH THE AGES. By C.-E. A. Winslow and Grace T. Hallock. Metropolitan Life Ins. Co., 1933. 64 pp. Free to junior and senior high school classes.

NATURE, M.D. HEALING FORCES OF HEAT, LIGHT, WATER, ELECTRICITY AND EXERCISE. By Richard Kovacs. New York: Appleton, 1934. 181 pp. Price, \$2.00.

A SELECTED PUBLIC HEALTH BIBLIOGRAPHY WITH ANNOTATIONS

Iconoclasts Air Views on Health Examinations—"The Periodic Health Examination is a procedure which will occasionally reveal early remediable diseases. It is a luxury and should be paid for as other luxuries. . . . The examination provides an opportunity to discuss hygienic habits of the individual and to educate him in the value of investigating any recently acquired trivial signs or symptoms. From this leads our (Committee on Public Health, Massachusetts Medical Society) conclusion: that universal investigation of recently acquired trivial signs and symptoms by the family doctor would be more profitable than the periodic health examination, and that it should be substituted for the periodic health examination in future propaganda."

ANON. The Periodic Health Examination. *New Eng. J. Med.* 210, 4:225 (Jan. 25), 1934.

Does Impeded Drainage of the Breast Cause Cancer?—Of 200 cases of mammary cancer, only 8 per cent gave a normal nursing history, or a history free from factors causing impaired drainage; every third pregnancy had ended in a miscarriage or abortion. In the control group, one 1 in 7 pregnancies ended this way, while 80 per cent gave a normal nursing history.

ADAIR, F. E. Etiological Factors of Mammary Cancer in 200 Women. *New York State J. Med.* 34, 2:61 (Jan.), 1934.

Skin vs. Bacteria—"Living bacteria placed on the skin rapidly disappear from this surface. They cannot be demonstrated by cultural or tinctorial methods 30 or 40 minutes after contact with the surface of the skin."

ARNOLD, L. and ALEXANDER, B. The Self-Disinfecting Power of the Skin. *Am. J. Hyg.* 19, 1:217 (Jan.), 1934.

Varied Pictures of an Influenza Epidemic—Immediately after the 1928 influenza outbreak, surveys were made in 14 cities and the result analyzed in relation to age, sex, and color. Probably the most valuable findings will be seen in the variation in extent and severity in the several communities studied.

COLLINS, S. D. The Influenza Epidemic of 1928-1929 in 14 Surveyed Localities in the United States. *Pub. Health Rep.* 49, 1:1 (Jan. 5), 1934.

What Makes the Vitamins Tick—The first of three excellent lectures on vitamins deals with their biochemistry. It is to be regretted that it appears only in a British journal and will not be available to all health workers for, though the chemical discussion will be quite beyond the comprehension of all but a handful, the reading would be worth while for all if only to disabuse our minds of any parochial ideas that the sum total of scientific advance is confined to the United States. The second and third lectures deal with the physiological functions of vitamins and the eminently practical problems of human nutrition. The author's thesis is that there is terrifying evidence of malnutrition despite the fact that there is not a large number of people actually short of food. When Englishmen were raised chiefly on coarse bread, cheese and beer, malnourishment was less rife than it is today, he tells us.

DRUMMOND, J. C. Modern Views of Vitamins and Their Functions. *J. State Med.* 42, 1:3 (Jan.), 1934.

Safeguarding Milk and Getting It Consumed—How Louisville enacted and enforced the standard milk code and boosted the consumption of milk

produced under it is recounted with sufficient detail to make the record of value to others.

DUGAN, S. H. V. Pure Milk Problem. Municipal Sanitation 5, 1:13 (Jan.), 1934.

How to Find Undernourished Children—To aid in sorting out school children who should be seen by a physician, an index is proposed which is better than height-weight-age and other criteria of nutritional status. Three simple measurements: arm girth, chest depth, and hip width, are used to screen out the undernourished children who are subjected to more extensive tests or sent directly for medical examination.

FRANZEN, R. and PALMER, G. T. The A.C.H. Index of Nutritional Status. Child H. Bull. 10, 1:26 (Jan.), 1934.

Tuberculosis Aggravated by Silicosis—Four papers from the annual meeting of the N.T.A. are supplemented by another, on the roentgenological aspects, to form a symposium on the relationship of silicosis and tuberculosis. The series presents much that is new on the subject; hence it is an important addition to the literature of industrial hygiene.

GARDNER, L. U., LANZA, A. J., *et al.* Silicosis (etc.). Am. Rev. Tuberc. 29, 1:1 (Jan.), 1934.

A Good Word for Russian Public Hygiene—How women and children are cared for under the Russian scheme of socialized medicine is told with sufficient thoroughness to excite the inevitable high-powered debate.

KINGSBURY, J. A. Russia Demonstrates Socialized Health. Pub. Health Nurs. 26, 1:5 (Jan.), 1934.

Where Health Insurance Has Been Tried—No country in which a scheme of compulsory health insurance has been adopted has ever abolished it. Criticism has not been lacking, but it is directed against practices not the

principle, which is now approved by the International Medical Association Council.

McCLEARY, G. F. Health Insurance in Europe. Milbank Quart. Bull. 12, 1:3 (Jan.), 1934.

Dust Particles Injected Into the Body—Dusts of different kinds were injected intraperitoneally into guinea pigs. Calcium dusts were absorbed without producing scar tissue; quartz and flint produced nodules which continued to increase in size; soapstone, coal, etc., were inert in reaction. This response may be used for the classification of industrial dusts.

MILLER, J. W. and SAYERS, R. R. The Physiological Response of the Peritoneal Tissue to Dusts Introduced as Foreign Bodies. Pub. Health Rep. 49, 3:80 (Jan 19), 1934.

What Nurses Ask For—"In the health officer she expects superior knowledge of public health needs, leadership in defining policies, interpretation of scientific facts, guidance in adapting public health procedures, coördination of all community health activities, popularization of her services, a connecting link and buffer to the medical profession, a health educator, and an executive who understands and appreciates the individual"; a large order!

MILLER, R. K. What the Nurse Expects of the Health Officer. Pub. Health Nurs 26, 1:16 (Jan.), 1934.

Diabetes Increases Tuberculosis Susceptibility—Pulmonary tuberculosis occurred 10 times more frequently in juvenile diabetics than among normal children, and the incidence of tuberculosis among adult diabetics is increasing despite a reduction in community contacts. Does diabetes lower resistance to tuberculosis? This and some other questions are studied.

ROOF, H. F. The Association of Diabetes and Tuberculosis. New Eng. J. Med. 210, 1:1 (Jan. 4), 1934.

NEWS FROM THE FIELD

RESOLUTION ADOPTED BY THE SOUTHERN MEDICAL ASSOCIATION AT ITS RICHMOND MEETING

DR. William Weston, Columbia, South Carolina, a past member of the Council, accompanied by Dr. Robert Wilson, Charleston, S. C., a past president of the Association, appeared before the Council and presented the following resolutions:

WHEREAS, Investigations reveal information that nutritional deficiency is constantly assuming a more important rôle as the etiological factor of many diseases that have heretofore not been understood; and as it is now known that there are present in the United States a great many diseases belonging to this group, some of which diseases are widespread, increasing in number and are seriously undermining the health and vitality of the people of this country; and

WHEREAS, We have little definite knowledge of the chemistry of our foods, because analyses which have been made in order to determine their nutritional value have been local or sectional and no sustained effort has been made upon a broad scale to supply such information as is necessary in order to determine the localities from which our food supply should be drawn; and,

WHEREAS, It is known that in certain localities and under certain circumstances, the chemical elements of common foods, such as milk, fruits, vegetables and cereals, show marked differences in value while it is known that in other localities certain vegetables absorb poisonous substances which render them of doubtful food value; and

WHEREAS, no real progress can be made in the solution of nutritional deficiency diseases until chemical analyses of foods are made upon a broad and impartial scale and the relationships of the different chemical elements studied with scientific care; and

WHEREAS, The whole scientific world is aroused to the importance of this fundamental work in order that grave public health problems and the vitality and strength of the people of this nation be safeguarded;

THEREFORE, BE IT RESOLVED,

(1) That the Federal authorities be urged to undertake this work upon a broad, com-

prehensive and impartial scale in collaboration with selected medical colleges in the different sections of the country.

(2) That the Southern Medical Association urge that this work be undertaken at the earliest possible moment.

(3) That the Southern Medical Association request the coöperation of all other state and national medical associations in this country.

(4) That the Southern Medical Association appoint a committee whose duty and purpose it shall be to confer with the National authorities at the earliest possible moment and proceed with the work.

The resolutions were unanimously adopted, Dr. William Weston to be the Chairman of the special committee provided for in the resolutions, the two other members of the committee to be selected by the Chairman in conference with the President. The Chairman with approval of the President appointed as the other two members of this Committee: Dr. M. P. Ravenel, Columbia, Missouri; and Dr. J. E. Knighton, Shreveport, Louisiana.

The report of the Board of Trustees, incorporating the report of the Secretary-Manager, was received, discussed, and unanimously approved.—*South. M. J.* Jan., 1934, pp. 70-71.

NATIONAL COMMISSION ON CORRECT DIET

THE National Commission on Correct Diet appointed by the Government of Uruguay a few years ago has recently been conducting a campaign for the purification of the milk supply. The commission supervises the production, pasteurization, and handling of milk in different places and takes part in the enforcement of the municipal regulations concerning milk in Montevideo. The commission has also been active in teaching dietetics to the public, and particularly to school children, and

it has made a study of the nutrition of school children in the interior of the country. Members of the commission have given lectures on dietetics in the 12 child-health centers in Montevideo and in other child-welfare institutions.—*Boletín de la Oficina Sanitaria Pan-americanos*. Washington, Sept., 1933.

AMERICAN SOCIAL HYGIENE ASSOCIATION ELECTS NEW OFFICERS

THE annual business meeting of the American Social Hygiene Association was held January 31, at their offices in New York. Officers were elected as follows:

Honorary President, William H. Welch, M.D.; President, Edward L. Keyes, M.D.; Vice-Presidents, Roscoe Pound, Eugene L. Bishop, M.D., Ray Lyman Wilbur, M.D., and Mary E. Woolley; Treasurer, Timothy N. Pfeiffer; Secretary, Mrs. Henry D. Dakin.

The month of March, 1934, marks the 20th anniversary of incorporation of the Association, which began its work under the guidance of President Charles W. Eliot, John D. Rockefeller, Jr., Henry Lee Higginson, Grace M. Dodge, and a distinguished group of directors.

SOUTHERN MEDICAL ASSOCIATION TO MEET IN TEXAS

THE next meeting of the Southern Medical Association will be held at San Antonio, Tex., from November 13 to 16, 1934.

NEGRO EDUCATION

THE Office of Education of the U. S. Department of the Interior is for the first time calling a National Conference on Fundamental Problems in Negro Education, to be held at Washington, May 1-6.

One of the problems to be discussed is the problem of education as it relates

to Negro health. The conference will attempt to understand the relations of the educational problems involved in the professional education of Negroes, student health education, and child health. The subjects of vocational guidance, citizenship, and home life and health will be studied.

PERSONALS

GRACE M. COFFMAN, formerly director of the Tacoma, Wash., Public Health Nursing Association, is the new Assistant Director on the staff of the National Organization for Public Health Nursing, New York.

LOUISE M. TATTERSHALL, for almost 10 years statistician of the National Organization for Public Health Nursing, New York, has resigned to accept a statistical position with the Children's Bureau in Washington, D. C. Mrs. Anna J. Miller, formerly with the American Child Health Association, has been appointed temporarily to fill Miss Tattershall's place.

JAMES E. PERKINS, M.D., DR.P.H., has been provisionally appointed epidemiologist on the staff of the Division of Communicable Diseases of the State of New York.

HUGH R. LEAVELL, M.D., member A.P.H.A., has been appointed Health Officer of Louisville, Ky. He received his B.S. at the University of Virginia, and his M.D. at Harvard. He served as interne in the Massachusetts Hospital, Columbia Presbyterian Hospital, and Johns Hopkins University. From 1930 to 1933 he was instructor of medicine in the University of Louisville.

DEATH

LINSLEY R. WILLIAMS, M.D., Fellow A.P.H.A., director of the New York Academy of Medicine, died January 8, after a long illness.

CONFERENCES

March 29, 30, 1934, Annual Meeting of the American Association of Pathologists and Bacteriologists, Toronto, Ont., Canada.

April 1-8, National Negro Health Week.

April 16-17, Eighth Annual Meeting of the Florida Section of the American Water Works Association, Daytona Beach, Fla.

April, 1934, Statistical Conference of the Royal Statistical Society and the International Statistical Institute, London, England.

April, 1934, Southeastern Section, American Water Works Association, Augusta, Ga.

April 16-20, 1934, Eighteenth Annual Clinical Session of the American College of Physicians, Chicago, Ill.

April 23-27, Biennial Nurses' Associations Meeting. American Nurses' Association, National Organization for Public Health Nursing, and National League of Nursing Education, Washington, D. C.

May 1-6, National Conference on Fundamental Problems in Negro Education, Washington, D. C.

May 13-19, 38th Annual Convention of the National Congress of Parents and Teachers, Des Moines, Ia.

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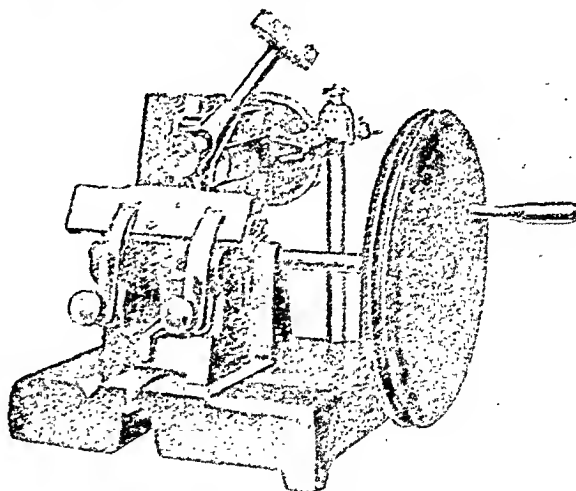
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Methods for the Microbiological Analysis of Butter*

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Lafayette, Ind.*

DURING the past few years the routine analysis of butter for yeasts, molds, and bacteria has increased, due no doubt to the widening application it has as an index to sanitary conditions and the efficiency of the manufacturing processes in the creamery. Because of this interest there was appointed in the American Dairy Science Association a committee to study the methods used and with the hope that they could suggest what later would develop into a standard procedure. This committee consisted of Dr. B. W. Hammer of the Iowa State College, Dr. E. G. Hood of the Dairy Research Laboratories of the Dominion of Canada, Dr. H. Macy of the University of Minnesota, and myself as chairman. The first work of this committee was to get together the existing methods and study them, and a report was issued on this work in 1930.⁵ Three years later⁶ another report was issued, and those who have read these two reports have noted changes. These changes were a result of experimenta-

tion. Another objective that this committee has been mindful of is to suggest those procedures which will give only the truest microbiological analysis, and it has, as far as possible, kept the number of suggestions as to methods at a minimum, realizing that the fewer the more likelihood of uniformity. An insight into some of the research done by this committee and its associates may improve your laboratory practice, and the committee will also appreciate aid in perfecting these methods. Methods of sampling and care of samples prior to analysis are omitted from this discussion, for there has been but little controversy as to these methods suggested in 1930.

Of the routine analysis made on butter, probably the most common is the determination of the number of yeasts and molds. The number of yeasts and molds in butter reflects the efficiency of pasteurization—for proper pasteurization destroys most of the yeasts and all of the molds—and the sanitary conditions under which the butter is manufactured. Improperly cleansed and sterilized equipment gives high yeast and mold content. Standards as to numbers of yeasts and molds to be

*Read before the Laboratory Section of the American Public Health Association at the Sixty-second Annual Meeting in Indianapolis, Ind., October 12, 1933.

TABLE I

COUNTS OF YEAST COLONIES FROM BUTTER SAMPLES ON MEDIA OF DIFFERENT pH VALUES

Sample	pH 3.0	3.4	3.8	4.2	4.6
2	142	156	179	189	183
6	131	156	179	144	135
10	95	81	69	83	99
20	132	133	133	147	124
23	286	410	440	462	445
27	17	46	42	39	52
30	236	217	241	252	291
34	165	187	179	189	186
38	13	28	28	32	28
43	193	302	288	307	290
53	112	132	121	130	124

allowed in butter have been suggested, and in Canada a score card for grading butter is used which allows points if the number of yeasts and molds is below a definite number. The technic of making this count had not been studied in detail until a few years ago.

In 1928, Hood and White¹ made a study of the various methods used to determine the number of yeasts and molds in butter. They studied 8 media and found that the pH used by different workers varied from pH 3.5 to 4.6. The counts secured on the media adjusted to pH 4.6 were much higher than those on the media adjusted to pH 3.5, the probable reason being that at pH 4.6 many bacterial colonies developed and these were counted as yeasts, since subsurface yeast colonies are difficult to differentiate from bacterial colonies. The media used were supposed to be specific for yeasts and molds.

The evidence secured indicated that a pH of 3.5 was necessary if one was to be reasonably assured that all bacterial colonies were to be inhibited. The question arose as to whether pH 3.5 would not be inhibitive to some yeasts and molds. White and Hood² made a study of 63 representative yeast cultures secured from a wide range of Canadian butters, and found that their growth on malt agar was not adversely affected at a pH range of 3.4 to 4.6. In the study of the effect of pH on

the yeast count of butter they procured somewhat similar though not quite identical results.

The general trend, as shown in Table I, was that the number of colonies decreased as the acidity of the medium increased, though the variations in yeast and mold counts at pH 3.4 to 4.6 are not great enough to be of practical significance in routine analysis of butter.

Hood and White used in this work dehydrated malt agar, Difco. The American investigators had used whey agars prepared in two different ways, rennet and by acid coagulation. Parfitt³ made a comparison of 9 media all of which had been used and recommended for the determination of yeasts and molds in butter. The media were acidulated to pH 3.5 with lactic acid and it was found that the whey agars prepared in the laboratory were quite inferior to other media in obtaining the maximum counts of yeast and mold.

TABLE II

LOG AVERAGE YEAST AND MOLD COUNT OF 32 BUTTERS

Media	Yeasts and Molds per c.c.
Whey agar rennet coagulation	712
Whey agar acid coagulation	2,172
Whey agar dehydrated	3,831
Standard nutrient agar +5% dextrose	2,130
Wort agar dehydrated	3,684
Malt agar dehydrated	3,164

The other 3 media studied, standard nutrient agar, standard nutrient agar plus 1 per cent lactose, and infusion agar plus 1 per cent lactose, yielded higher counts than whey agar prepared by rennet coagulation, but did not support as many colonies as the dehydrated wort or malt agar.

It was of particular interest to know why the whey agars did not yield as high counts as the dehydrated agars. In all probability the natural habitat of these yeasts and molds is in milk or cream, for they are associated with dirty churns and other improperly cleansed equipment. There appeared to us two possibilities,—the buffer capacity of the medium and the oxidation reduction potential intensity of the medium. If we considered the buffer capacity of the whey media it was found that those media which required large amounts of lactic acid in order to bring them from pH 6.8 to 3.5 supported the least number of colonies.

TABLE III

CUBIC CENTIMETERS OF N LACTIC ACID TO
ADJUST 100 C.C.

Whey—rennet coagulation	11.0
Whey—acid coagulation	6.5
Whey—dehydrated	2.0

Experimenting later with tomato juice agar, it was found to yield counts equivalent to those media which required but 2.0 c.c. of N. lactic acid to adjust them, but tomato juice agar required about 18 c.c. of lactic acid to adjust it from 6.8 to pH 3.5. Thus it appears that the limiting factor is not the buffer capacity of the medium.

TABLE IV

MEAN YEAST AND MOLD COUNT OF 39 BUTTERS

<i>Media</i>	<i>Yeasts and Molds per c.c.</i>
Potato dextrose agar	218
Tomato agar	225
Wort agar	179
Standard nutrient agar +2% dextrose	150

Work is in progress to determine if the oxidation reduction potential of the medium is the limiting factor.

From the results so far secured it is indicated that the dehydrated media gave the highest counts. In seeking a medium which could be prepared in the laboratory easily, and after trying several, potato dextrose agar was found to yield satisfactory results. White and Hood had used dehydrated potato dextrose agar with good success but did not recommend it because of expense.

These counts indicate that tomato juice agar is slightly superior to potato dextrose agar but not enough to justify the additional trouble and expense. Tabulating the counts of these 39 butters in the order of their placings, the same conclusions are found as from the geometric means.

TABLE V
DISTRIBUTION OF BUTTERS

	1	2	3	4
Potato	14	6	8	4
Tomato	10	14	5	3
Wort	6	7	14	3
Standard + 1% dextrose	8	9	6	9

7 butters 0 count

Potato dextrose agar gives a clear medium, and is easily prepared, requiring only potatoes and commercial dextrose. The yeast colonies are large and if brom-phenol-blue is used in place of electrometer measurements to adjust pH, the medium does not have a color which makes it difficult to adjust to the yellow green of pH 3.5. This point should be emphasized, for with malt and wort agars considerable difficulty is experienced in adjusting the medium. It has been found good practice to add 0.5 c.c. of a 0.75 per cent solution of brom-phenol-blue to the media not only to assure correct adjustment, but because yeast colonies absorb the dye, making counting much easier and reducing the number of unsatisfactory

TABLE VI

INFLUENCE OF TEMPERATURE AND LENGTH OF INCUBATION TIME ON YEAST COUNT CULTURE

Culture No.	25° C.		30° C.		37° C.	
	48 hrs.	5 days	48 hrs.	5 days	48 hrs.	5 days
1	466	483	479	487	455	463
6	253	460	246	251	0	0
9	169	171	145	171	0	0
10	89	92	65	68	9	10
12	295	296	269	279	0	0
15	155	168	124	155	0	0
19	120	121	135	135	139	145
21	260	267	273	285	0	0

plates due to over growing of the plate by molds.

A study has been made of tartaric, citric, hydrochloric and sulphuric acids, and it has been found that the acid used in adjusting the pH of 3.5 is a factor in the growth of yeasts and molds. The results indicate that equally as high counts are obtained with tartaric than with the other acids. An objection was found to the acids studied other than tartaric—that as the yeast and mold colonies developed they neutralized the acid, raising the pH. If an indicator such as brom-phenol-blue is put into the medium this change becomes very apparent. These organisms neutralized citric acid more rapidly than lactic and lactic more rapidly than hydrochloric or sulphuric, and tartaric the least. This point is of importance because, in plates which contain large numbers of yeast and mold colonies, there the chance is afforded for bacteria to grow due to the increased pH.

From a group of malt agar plates which had been incubated 5 days at 21° C. 18 plates were selected, 6 heavily seeded, 6 containing between 100 and 300 colonies and 6 containing less than 100 colonies. The media had been adjusted to pH 3.5 at the time of pouring with lactic acid. At the conclusion of the incubation period the pH was again determined using a quinhydrone electrode, on the plates, with the following results:

Check Plates	pH 3.50
Heavily seeded	4.51
Medium seeded	3.96
Lightly seeded	3.77

Plates acidulated with tartaric acid did not show the same decrease of pH as did the other acids.

The incubation temperature for yeasts and molds suggested in the committee's report is 21° or 25° C. for 5 days. This recommendation is based upon the work of Hood and White² who found that 25° C. for 5 days gave the highest counts. A part of their results is given in Table VI.

While it is to be noted that in most of the samples little difference was found in the 48 hours' and 5 days' count there was a noticeable difference in colony size.

The author's comments on colony size is as follows:

In the majority of cases the yeast colonies were very small after only 48 hours' incubation, and it was necessary to use a hand lens if all colonies were to be included. With some cultures, principally the pink yeasts, the colonies were large enough to count with the naked eye after 48 hours. At 5 days, however, all colonies from each culture were sufficiently large to be counted with the naked eye.

In the routine analysis of butter the total bacterial count has not had the usage that the total bacterial count in milk has had, due to the fact that starters or butter cultures are frequently used in the manufacture of butter and

by their addition to the cream the count is greatly increased and its significance becomes valueless. There are occasions, however, when total bacterial count is desired and the unpublished work of A. H. White shows that the medium yielding the highest counts was infusion agar with the addition of 1 per cent lactose. This investigator obtained equally as satisfactory results when using Bacto beef as when using infusion agar, and the Bacto product is much the easier to prepare. No comparative counts have been made using tomato juice agar or yeast extract agar for the total count.

In studying some of the specific defects in butter due to the action of microorganisms the total count is very helpful, especially if correlated with an incubation of the butter itself to determine if the defect can be intensified. It is therefore essential to use a medium that will support a satisfactory growth of most of the microorganisms. For butters made without starter, much could be determined about the methods of manufacture and the probable keeping quality if the kinds of bacteria present are determined. There are two groups of microorganisms which are the most important from the standpoint of keeping quality—the proteolytic and the lipolytic.

The determination of the proteolytic and lipolytic groups of bacteria would hardly be advisable for routine work, but frequently those in laboratories are called upon to determine the cause of a specific defect. Among butter defects caused by microorganisms are the breakdown of the protein (proteolysis) and hydrolysis of the fat (rancidity).

For the determination of members of proteolytic bacteria in butter there are suggested two methods: (1) the picking of contiguous colonies and inoculating into skimmed milk; (2) direct counting, using a medium containing casein. These two methods are at this

time suggestive, and considerably more work is needed in the making of comparisons. Probably the simplest method of determining the proteolytic types is the addition of approximately 0.5 ml. of skimmed milk to the plate just prior to pouring, infusion agar being used as a base; proteolysis is detected by a clearing around the colony. Experience is necessary to differentiate clearing due to acidity or proteolysis. It is advisable when in doubt to flood the plates with 10 per cent hydrochloric acid solution, and if the clearing remains it denotes true proteolysis. The media suggested by Frazier and Rupp⁴ has given successful results, but there is need for more investigational work. It may be of interest to know that about a year ago the Dairy Research Committee of the Empire Marketing Board drew up a set of methods for the microbiological analysis of butter. These methods were very similar to those suggested in this country and the two committees had worked independently of each other. Their recommendations on proteolytic bacteria are of interest. They suggest the gelatine plate for the determination of liquefaction and skimmed milk agar consisting of 1.5 per cent agar plus 10 per cent skimmed milk. This latter medium would meet with the approval of those who feel that the addition of peptone and other readily digestible nitrogenous substances permits protein digesting bacteria to grow without producing the clear-cut proteolytic zone.

For the detection of those organisms which hydrolyze milk fat the method suggested is one which utilizes the dye nile-blue sulphate. An emulsion (agar, water, and milk fat) is made, to which is added nile-blue sulphate and this is added to infusion agar. The milk fat globules are dyed pink which if hydrolyzed are turned to a blue. Care should be taken not to confuse absorption of the dye by the colony as hy-

drolysis for occasionally it will be found that some colonies absorb the dye and become blue.

MICROSCOPIC METHODS

The technic worked out by Hammer and Nelson and reported in *Research Bulletin No. 137* of the Iowa State Agricultural Experiment Station is well known and needs no comment. This technic is very valuable in appraising the keeping quality of a butter, and in knowing something of the flora it contains. Microscopic methods have many advantages over cultural methods and too frequently the laboratory technician

leans too heavily upon the cultural, where so many factors must be controlled in order to get a correct analysis.

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Nutritive Value of Boiled and Raw Milk in Infant Feeding

WHILE there is considerable material which has been summarized by various writers concerning the absorption of the various food constituents in milk, there are few exact data regarding the influence of sterilization on the nutritive value of milk when fed to the infant.

Two healthy infants, 8 and 7 months old respectively, were fed on a measured amount of boiled cow's milk for 10 to 14 days, during the last 7 of which, the excreta were collected. The same procedure was followed with raw milk

for a fortnight. Aliquot samples of milk were collected for analysis each day during the two periods, and the intake and output of nitrogen, fat, calcium, and phosphorus in each of the 7-day periods were determined and the retention of each calculated.

The authors conclude from their results, as far as they go, ". . . there is no evidence to support the idea that the boiling of milk interferes with its usefulness as a food for infants."—Noah Morris, M.D., and Stanley Graham, M.D., *Lancet*, Dec. 9, 1933, p. 1314.

Cough Plate Examinations for B. Pertussis*

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THIS paper is a report on one phase of a more general study of the problem of whooping cough control in Grand Rapids, a city of 176,700 population. To be convinced of the importance of such a study in as many centers as possible, it is only necessary to consult morbidity and mortality statistics. Approximately 6,000 deaths from whooping cough are reported every year in the United States. Most of them are among children under 5 years. The importance of whooping cough as a cause of death in this age group is well illustrated by figures taken from reports of the Bureau of Records and Statistics of the Michigan Department of Health.

occur, conscientious reporting by physicians, adequate isolation of infective cases by health departments, and the development and appropriate use of specific agents for its prevention. Our larger problem, therefore, falls naturally into several divisions, and includes: (1) an attempt to determine the practicability and value of maintaining a continuous cough plate diagnostic service in a community such as this; (2) an analysis of the applicability of the results of such a service in obtaining earlier diagnosis and a more adequate isolation and release program; (3) maintenance of a constant supply of freshly isolated cultures for study and for use in pertussis vaccine; (4) a study

TABLE I
MICHIGAN DEATHS IN CHILDREN UNDER 5 YEARS
A COMPARISON OF COMMUNICABLE DISEASES

1929	1930	1931	1932
250 Whooping cough	186 Measles	183 Whooping cough	193 Whooping cough
211 Diphtheria	171 Whooping cough	151 Tuberculosis	139 Measles
185 Tuberculosis	162 Tuberculosis	70 Diphtheria	111 Tuberculosis
111 Measles	122 Diphtheria	42 Scarlet fever	40 Diphtheria
72 Scarlet fever	53 Scarlet fever	17 Measles	37 Scarlet fever

If whooping cough eventually is brought under control, it will be due to a number of factors—including, no doubt, an earlier diagnosis of the disease and the finding of more cases that

of the cultures isolated, including serological and other reactions and, (5) an immunization study.

The data in the present report are concerned particularly with the cough plate as a routine diagnostic procedure in a public health laboratory. In Copenhagen, the method essentially as first used by Chievitz and Meyer¹ has

* Read before the Laboratory Section of the American Public Health Association at the Sixty-second Annual Meeting in Indianapolis, Ind., October 12, 1933.

been employed since 1916 at the State Serum Institute.² In this country, its use seems to have been limited largely to special studies of whooping cough such as those of Sauer and Hambrecht,³ Lawson and Mueller,⁴ Culotta and Harvey,⁵ and the demonstration by the Cattaraugus County Health Department, reported by Kline,⁶ and to the temporary use for obtaining cultures of *B. pertussis* for study or use in vaccine. As a routine procedure in a public health laboratory, we believe the cough plate method has been quite neglected. In the Western Michigan Division of the Bureau of Laboratories, Michigan Department of Health, Grand Rapids, the cough plate diagnostic service for whooping cough has been available continuously since November, 1932.

EXPERIMENTAL METHODS

Cough plate medium—With few modifications, the original formula of Bordet and Gengou⁷ has been used. The potato-glycerine-agar base is prepared in large lots and stored in 200 c.c. amounts. This base medium is melted and blood added as needed, at which time the finished medium is dispensed into glass Petri dishes for cough plates and into tubes for stock cultures. Because of its availability in our laboratory, sheep's blood is used for enrichment—having been found as satisfactory as human blood. To each 200 c.c. of base, 30 c.c. or somewhat less than 15 per cent of blood is added. Although this is much less than recommended by Bordet or reported by other workers, it has given as successful isolation of *B. pertussis* as larger amounts and has therefore been used throughout the study. In several lots of medium, the addition of lactic acid, as suggested by Gardner and Leslie⁸ was tried but never with better results. In fact, such a medium had a tendency to darken and give less satisfactory growth.

The importance of the salt content of

the medium came to our attention early in the study, in our attempt to explain occasional lots of base which partially hemolyzed the blood and gave less satisfactory growth. By the addition of titrated amounts of sodium chloride to such a base, the difficulty was overcome. No reason has been found for the relatively small amount of added sodium chloride in the original Bordet-Gengou formula. The final content was less than 0.5 per cent—a quantity of salt dangerously near the lower level tolerated by red blood cells. By substituting 0.75 per cent sodium chloride for the 0.6 per cent solution used in the original formula, we apparently have given the necessary safeguard against occasional lots with an insufficient salt content and there has been no inhibition of clear-cut hemolysis. This modification has made more certain the bright red plate so necessary to optimum results.

Exposure of plates—As is true for any laboratory specimen, proper collection of the cough plate is important. That successful exposure of the cough plate is not an insurmountable difficulty, however, is demonstrated by the fact that the data presented are based upon the findings in plates exposed by 22 physicians, 3 bacteriologists, 20 nurses and a number of mothers. The exposed plate is held 4–5 inches from the patient's mouth during several expulsive coughs. It is often necessary to induce a cough by tickling the throat with a swab or tongue depressor, by pressing on the larynx, by a drink of ice water, or by some other device.

*Examinations of plates and Criteria for the identification of *B. pertussis**—The plates are examined several times during the first 48 hours of incubation for molds or spreaders which might overgrow the plate. Such colonies are cut out with a sterile needle or scalpel. At the end of 48 hours the plates are examined for colonies of *B. pertussis*

and this is repeated twice a day thereafter. If *B. pertussis* has not been found by the end of 4 days, a negative report is made. The plates are incubated and observed for 2 more days, at the end of which they are discarded. In the rare instance of a positive during that time, an additional report is made.

In a nicely seeded, uncrowded plate, colonies of *B. pertussis* can be recognized macroscopically after 48 to 72 hours with a great degree of certainty. As a source of light for examining the plates the ordinary sub-stage microscope lamp with white ground glass is very satisfactory. The uncovered plate is placed over the lamp and the colonies studied with the aid of a hand lens (10x). By transmitted light, *B. pertussis* colonies appear smooth, raised, glistening, pearly, and almost transparent while the colonies of gram positive cocci in general appear duller, darkly colored and opaque. This light also reveals the zone of hemolysis which is characteristic of *B. pertussis*—a zone which is not sharply delimited but merges somewhat diffusely into the surrounding medium. In general, it may be said that the colony characteristics of *B. pertussis* on Bordet-Gengou medium are even more distinctive than are those of hemolytic or green producing streptococci on ordinary blood agar.

Confirmation of the identity of selected colonies is based upon several points. The consistency of the growth and the manner of its diffusion into water are very typical of *B. pertussis* and have been noted by Sauer.⁹ As a loop of growth touches a drop of water or saline, it spreads and shows at first a momentary clumping but, with very slight agitation, it quickly smooths into a homogeneous suspension. Stained by Gram's method, *B. pertussis* decolorizes readily—much more readily, in fact, than does *H. influenzae*. Viewed microscopically, the small faintly-stained

coccoid bacilli are scattered evenly throughout the film occurring singly for the most part, seldom in chains of even two and never observed as pleomorphic threads. Slide agglutination tests have been used frequently for the confirmation of colonies. The colony is emulsified in a drop of saline and a loopful of the suspension mixed with a loopful of antiserum, diluted 1:10, the remainder of the suspension being used as a control. Agglutination of *B. pertussis* is immediate and complete and readily observed with the unaided eye. The dried stained films, when observed microscopically, show the typical arrangement in the control suspension and definite clumps in the test suspension. These simple slide tests have proved reliable and of especial value in identifying suspicious colonies from plates too crowded or darkened by certain types of growth for the distinctive characteristics to be satisfactorily observed. In the case of less satisfactory plates, it is advisable to transplant suspected colonies to fresh medium. The resulting subculture grows sufficiently for identification within the next 24 hours.

Agglutination technic—The details of the method employed are outlined in a separate communication.¹⁰ In brief, it is essentially the technic devised by Noble,¹¹ and it eliminates the troublesome, nonspecific settling and clumping of *B. pertussis* suspensions which have stood for a few hours. The antisera used for the tests were produced in rabbits by the injection of suspensions of recently isolated cultures and according to the terminology of Leslie and Gardner¹² were Phase I sera.

General plan of collecting plates—Since the cough plate diagnostic service was first offered, a number of physicians, mainly pediatricians, have used cough plates in all cases suggesting whooping cough. During the earlier months, members of the laboratory staff also collected plates as a part of the immuniza-

TABLE II

SUMMARY OF COUGH PLATE EXAMINATIONS

<i>Clinical Diagnosis</i>	<i>Number of Cough Plates</i>		
	<i>Positive</i>	<i>Negative</i>	<i>Total</i>
Whooping Cough Through 4 Weeks	163	63	226
Post-Whooping Cough, 5 weeks to 6 months after onset	2	166	168
Other than Whooping Cough	0	66	66
Clinical Data Not Available	0	35	35
Totals	165	330	495
Unsatisfactory Plates			16

tion study outlined above. The cases included in that series were for the most part in families receiving aid from the city, and therefore visited by city physicians and nurses. As the work enlarged, it became impossible for the bacteriologists to make all the required calls. In the meantime the City Health Department had found the laboratory results useful and in order to continue and enlarge the work, they offered the services of the Bureau of Public Health Nursing. Since this bureau uses the district nursing plan, it was agreed that each nurse secure the desired cough plates from welfare patients in her district. Because of her familiarity with the territory as a whole and with each family as a unit, the plan proved an ideal way of meeting the situation. The nurses, after instruction in technic, have been successful in exposing plates.

A further step was taken recently when the City Health Officer, Dr. A. H. Edwards, offered Grand Rapids physicians the services of the nurses for collecting plates from their private patients. At present, then, most of the plates reaching the laboratory are collected by a group of about 25 nurses experienced in the procedure. Copies of all cough plate reports are sent to the City Health Department, as for other communicable diseases.

EXPERIMENTAL DATA

Summary of cough plates—In Table II is a summary of the cough plates submitted to the laboratory between November 1, 1932, and September 1, 1933, classified according to clinical diagnosis.

Whooping cough cases—The cough plates from patients with whooping

TABLE III

WHOOPIING COUGH CASES: SUMMARY OF PLATES
CORRELATED WITH STAGE OF DISEASE

<i>Week of Disease</i>	<i>Number of Plates</i>			<i>Per Cent of Positive Plates</i>
	<i>Positive</i>	<i>Negative</i>	<i>Total</i>	
1	62	20	82	75
2	55	24	79	70
3	39	8	47	83
4	7	11	18	39
5	2	17	19	11
6	0	12	12	0
Totals	165	92	257	

cough, so diagnosed by the physician, are summarized separately in Table III.

Because of its bearing on the practicability of obtaining cough plates on young children, it may be mentioned that of the positive plates tabulated, 42 were from children 2 years old or less. Of these 42 children, 9 were 5 weeks to 6 months, 3 were 7 to 11 months, and 30 were 1 to 2 years of age. In comparison, there were 23 negative plates from pertussis patients of the same age group, taken during the first four weeks of disease. In other words, approximately 65 per cent of plates obtained from children 2 years of age or less, during the first 4 weeks of disease, were positive.

Comparison with certain other reports—The percentages used in Table III were calculated on the basis of number of plates, without regard to the fact that in certain instances, there were several plates on the same patient. Most percentages recorded in previous tabulations have been based on the number of patients found positive, disregarding the number of examinations made to obtain the result. Calculating our percentages on this basis for the sake of comparison, we include them

along with certain previous reports in Table IV.

There is no question that by more often repeated examinations the percentages could be markedly increased. Since our examinations on the 207 cases tabulated numbered 257, it is evident that the number of repeat examinations was not large.

Carrier data—Before we proceed very far with a discussion of whooping cough carriers, we feel the need for definition. For the sake of clarity in our own thinking and discussion, we consider as carriers those individuals harboring *B. pertussis* who, (a) have no symptoms—the healthy carrier, (b) have had whooping cough for more than four weeks—the convalescent or post-whooping cough carrier, and (c) have respiratory symptoms diagnosed other than whooping cough. On the other hand, the patient with an atypical cough not otherwise diagnosed and a positive cough plate, we consider not as a carrier but as an abortive case of whooping cough. The data in Table V include the findings in those individuals who, if positive, are classified as carriers according to this definition.

The only positive cough plates we obtained from 234 examined were two

TABLE IV

COMPARATIVE FINDINGS OF VARIOUS AUTHORS
PERCENTAGE OF WHOOPING COUGH CASES FOUND POSITIVE BY COUGH PLATE METHOD

Year of Report	Authors	Per Cent of Patients Found Positive Stage of Disease in Weeks						Total Cases
		1	2	3	4	5	6	
1924	Chievitz & Meyer ¹	75	57	61	45	40	9	914
1927	Lawson & Mueller ⁴	59	53	33	38	15	6	533
1930	Sauer & Hambrecht ⁹	98	—	65	—	0	0	200
1932	Gardner & Leslie ¹²	75	67	75	25	0	0	47
1932	Culotta & Harvey ⁵	82	56	19	2	0	0	129
1933	Sauer—7 yr. summary ³	88	—	64	—	0	0	400
1933	Kristensen—15 yr. summary ²	65	58	52	40	34	8	2,144
1933	Kendrick & Eldering	84	78	83	31	11	0	207

As tabulated here, the week of disease given for one author is not always strictly comparable with that of another. For example, Sauer gives his results in terms of catarrhal and convulsive stages; Kristensen in terms of catarrhal and 1st, 2nd, 3rd, and 4th week of convulsive stage.

TABLE V
COUGH PLATE EXAMINATIONS FOR CARRIERS

Clinical Symptoms	Number of Plates	
	Total	Positive
Post-Whooping Cough		
5th week	19	2
6th week	12	0
7th week	6	0
8th week	7	0
2 to 6 months	124	0
No Symptoms	13	0
Respiratory—Not Whooping Cough	53	0
Totals	234	2

during the fifth week after the onset of whooping cough.

The second attack—Although a second attack of whooping cough usually is considered an infrequent occurrence, 7 of the cases of this series gave a history of previous pertussis. There is, of course, always the question of the reliability of the history. The second infection in each case was confirmed by a positive cough plate. Mrs. B., age 27, had a severe second attack, and gave a history of a severe case when she was an infant. Mrs. M., age 30, had a moderately severe second attack. Her mother stated that she had had whooping cough when she was a child. Miss R., age 25, a city nurse, had an abortive case which will be described later, and said she had had whooping cough when she was about 5 years old. The other 4 cases were children. D. B., age 4½, had a typical case of moderate severity, and was said by his mother to have had a similar case when he was 1 year old. F. H. and D. H., brothers, age 4 and 5, respectively, had severe attacks and were hospitalized for several weeks, 1 child with a complication of pneumonia. The mother said they had had whooping cough 2½ years before. J. H., age 3, had a severe case. His first attack, only 6 months previous to the second, had been diagnosed by a pediatrician.

The abortive case—If we define as an abortive case an individual harboring *B. pertussis*, having respiratory symptoms but not developing the typical paroxysms, and with an attack not clinically distinguishable as whooping cough, 5 cases would be so classified, 4 of which were children who had mild coughs for 1 to 3 weeks, in homes where other children had typical whooping cough. The remaining abortive case was the nurse, Miss R., cited among the second attacks. She developed what she considered to be a bad cold accompanied by a cough which never became paroxysmal and lasted about a week. As she was interested in the cough plate method she exposed a plate from which *B. pertussis* was isolated. About 6 days later a baby in the house developed whooping cough, and as it had had no other known exposure, it was concluded that the case was contracted from Miss R. These cases serve to emphasize the value of the cough plate in detecting atypical whooping cough, as well as to point out the importance of the atypical case in the spread of the disease.

Time required for diagnosis—The time required to complete a laboratory diagnosis is an important practical consideration. In Table VI the positive results for 10 months are tabulated in terms of days required to make the report. The information was obtained

TABLE VI
INCREASE IN SPEED OF DIAGNOSIS DURING PROGRESS OF STUDY

Relative Period of Study	Per Cent of Positive Plates Reported on Various Days After Their Receipt						Total Positive Plates
	2	3	4	5	6	7+	
First 6 Months	3	43	27	13	5	10	109
	73			28			
Subsequent 4 Months	23	53	15	8	2	0	53
	91			10			

by comparing the entry date with the date of report on the filed laboratory blanks.

A practical point brought out in this tabulation is the lessening of the time required for diagnosis as the study progressed and greater facility was gained. With greater experience, there is increased facility in recognizing colonies of *B. pertussis* as soon as they appear and it becomes necessary only in relatively few instances to wait for subcultures for differentiation. During the latter part of the year, 76 per cent of all positive reports were made within 3 days, and 91 per cent within 4 days. We believe this compares favorably enough with certain other accepted diagnostic procedures.

Scrological grouping of the cultures isolated—The maximum titers observed for the various antisera used in the agglutination tests ranged from 1:1,000 to over 1:4,000, in terms of final dilution in the 0.2 c.c. rapid test; or from 1:5,000 to over 1:20,000, expressed as equivalent titers—that is, in terms of the usual 1 c.c. test but based upon actual quantities of serum and antigen in the mixtures. For the sake of closer comparability with agglutination titers as usually given, the results of agglutination tests with 149 cultures are expressed in Table VII as equivalent titers.

All the Grand Rapids cultures, the 2 from Copenhagen, those from Sauer, the Lapeer, and the Phase I cultures

TABLE VII
SUMMARY OF AGGLUTINATION TESTS WITH
149 CULTURES OF *B. PERTUSSIS*

Number of Cultures	Designation of Cultures	Titers with Phase I Serum
136	Isolated at Grand Rapids	
	94 — to 14th day of disease	1:2,500 to 1:20,000+
	40 — 15th to 28th day of disease	1:2,500 to 1:20,000+
	2 — Over 28th day of disease	1:15,000 & 1:20,000
4	Old Laboratory Cultures (1911-1922)*	Negative (1:20)
6	Received from Lansing Laboratory	
	2 — Copenhagen	1:20,000
	1 — Lapeer, 1931	1:15,000
	1 — Sauer	1:15,000
	1 — Phase I Harvard	1:15,000
	1 — Phase III Harvard	Negative (1:20)
3	Received from Dr. Sauer, Evanston, Ill. recently isolated cultures	1:20,000

* Received through the courtesy of Parke, Davis & Co., Detroit.

from Harvard, were agglutinated to a significant titer by "Phase I" serum, while the 4 old laboratory cultures and the culture labeled Phase III were not agglutinated. From the tabulated data, it is seen that the Grand Rapids cultures were isolated at all stages of the disease—94 during the first 2 weeks, 40 during the third and fourth weeks and 2 after more than 4 weeks of disease. This suggests that, at least in their agglutination response, the cultures of *B. pertussis* did not change during the course of the disease. The agglutination of all these 144 cultures by "Phase I" serum is in harmony with the findings of Leslie and Gardner¹² with 20 recently isolated strains.

GENERAL DISCUSSION

Practicability of the cough plate method—It is with considerable interest that we have analyzed the results of the first year of continuous cough plate diagnostic service. Is the procedure practicable? Before starting this study, we were well aware of the difficulties held up as a warning to any workers who might be tempted to take the cough plate seriously. As in any diagnostic procedure, there are certain difficulties to overcome in mastering the technic. After a year's experience, however, we believe the difficulties have been over-emphasized. Great stress has been placed by various writers upon the differentiation of *H. influenzae* and *B. pertussis*. With a properly balanced medium and increased experience in examining the cough plate, this problem tends to vanish. The necessity of securing a constant, uniform and adequate supply of blood has been met under our particular conditions by the use of sheep's blood. *B. pertussis* is easily isolated on a medium enriched with sheep's blood, it grows well in mass culture, it is antigenic, and it produces toxic symptoms in animals. With respect to the time required for

diagnosis, we have shown that an unreasonably long period is not necessary, and it is entirely possible that future studies of the growth requirements of the organism will materially shorten the present minimum period. An important aid in making the procedure practicable in our particular community is the coöperative plan with the City Health Department already outlined. In brief, there are no insurmountable difficulties surrounding the cough plate technic and we believe it deserves a more prominent place than it now occupies in public health laboratory procedure.

The value of negative cough plate findings—Particularly in studying the period of infectivity, we wish to know how much dependence can be placed on negative findings. It is generally true of diagnostic procedures that negative results do not carry the same weight as positive ones. We do rely on them to an extent, however, in various communicable disease release procedures. Whether negative cough plates can be used as an indicator of the probable state of infectivity of a patient at the end of his isolation period is under study. The Michigan Department of Health regulation states that, "Patients shall be isolated for 3 weeks after development of the characteristic cough." The city of Grand Rapids requires 4 weeks. During this fourth week of isolation, we are securing 2 cough plates at least a day apart. We are hopeful that this study will afford information that will help to answer the question as to whether the cough plate has a place in the release of whooping cough. It is safe to say that the value of negative plate findings increases in direct proportion to excellence in technic of obtaining plates and facility in laboratory diagnosis.

The period of infectivity and the post-whooping cough carrier—Any discussion of whooping cough is limited by the difficulty of exactly establishing the

stage of disease and the impossibility of achieving entirely adequate definition of terms. Under the conditions of our own study, we have been able to determine with sufficient accuracy the date of onset and we have, therefore, expressed the stage of disease in terms of the day or week after onset of symptoms. We realize that designations by different workers of the week of disease cannot be strictly comparable. For example, many clinicians place the date of onset of a disease at the time when symptoms are severe enough for a physician to be called or for the patient to go to bed, whereas epidemiologists set the date of onset as the time when the first indication of illness is noted. However, keeping the limitations in mind, we believe a comparison of the results of different workers with respect to the period of infectivity as indicated by cough plate findings, has meaning and yields considerable information.

By referring to Table IV it is seen that aside from the reports of Chievitz and Meyer and of Kristensen, relatively few positive findings have been reported after the fourth week of disease. The findings in general point toward the first 4 weeks of disease as including the infective period in most instances. Our positive findings suggest that most whooping cough patients are actively infectious during the first 3 weeks, a certain percentage remain so during the fourth week and most of them are non-infectious after the fourth week.

As found in other communicable diseases, there are occasional individuals who harbor the infecting organism for longer than the average period. Just how important these individuals are as a reservoir of infection in whooping cough and whether they can be located by the culture method remains to be worked out. If it were true, as suggested by several authors, that the organisms lose their virulence during the course of

the disease, the carrier would present no problem; but convincing data on this point are lacking. It seems likely that the early case offers the greatest opportunity for exposure and is the most potent source of infection in whooping cough. However, we cannot disregard the significance of even a small per cent of post-whooping cough or convalescent carriers. To go a step further and translate the findings with respect to the period of infectivity into practicable communicable disease regulations is a problem for coöperative study between health department and laboratory and one which will require time.

Indirect results of cough plate study—Besides the more direct results which we believe are being obtained by the routine plate service, there are less tangible effects which play a part in the general effort toward whooping cough control. The members of the community in general are reminded of the disease and its importance and they are impressed with its communicability. As a physician recently expressed it, "Grand Rapids is whooping cough conscious." The district nurses are on the alert for suspicious cases. With the nurses available for collection of plates, more physicians are making use of the cough plate service, and incidentally they are reporting their cases to the Health Department. This increased emphasis upon whooping cough has the general effect of encouraging early recognition and better isolation.

SUMMARY AND CONCLUSIONS

1. Cough plate diagnostic service for pertussis has been available continuously for about a year at the Western Michigan Division Laboratory of the Michigan Department of Health, Grand Rapids. It is proving a practicable procedure under the conditions existing there.

2. During the past 4 months of this service, 23 per cent of the positive

diagnoses have been made within 48 hours after the plates have reached the laboratory, 75 per cent within 72 hours, and 91 per cent within 4 days.

3. The laboratory findings are being used by the City Health Department in obtaining earlier diagnosis of pertussis and thereby, it is hoped, more effective isolation of cases in their most infective stage. The possible applicability of the results to the problem of release is under study.

4. In agreement with the reports of most other authors, *B. pertussis* could be isolated from relatively few patients after the fourth week of disease. A patient with whooping cough of more than 4 weeks' duration, who can be shown to harbor *B. pertussis*, is defined tentatively as a post-whooping cough or convalescent carrier.

5. One hundred thirty-six cultures isolated from whooping cough patients, at times ranging from before onset to the 35th day of disease, were found to fall into the same serological group.

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Nutrition and Mental Outlook

"INDEED, the effect of nutrition on human physiology is so marked that one might even attribute an association between the unrest and distrust seen in the world today and the dietary which is directly affected by the economic situation. The hungry man is proverbially an angry man, and consequently discontented. It is common experience that the temperament and general outlook on life is governed by one's diet, its digestion, and its effect on the liver. The jaundiced view of

life is only an extreme expression of varying degrees of nutritional deficiency or excess. Our food refineries, tinned foods, rapid consumption of meals which we do not take time to enjoy or digest, may be affecting the mental outlook and destroying that peace and contentment to be found in adequately nourished individuals, particularly the beer-drinking, beef-eating Britisher."—J. O. Murray, M.D. The Public Health Outlook on Nutrition, *Pub. Health*, Feb., 1934, p. 164.

Immunity to Diphtheria and Response to Artificial Immunization of Children in Rural Virginia*

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THE rate of development of naturally acquired immunity to diphtheria and its level vary in different population groups and are influenced by numerous factors of environment. Density of population has been shown to be a factor having a great influence upon the natural development of immunity to diphtheria, also prevalence of the disease and variations in carrier incidence influence the speed with which a given population becomes immunized. Climate apparently not only influences the clinical aspects of the disease but there is evidence that in warm climates natives acquire immunity earlier and more rapidly than do natives of colder climates. With possible wide variations in natural immunity in mind it seems that the determination of the immunity status of a given population before attempting mass immunization is an important administrative procedure.

In order to obtain as nearly as possible a representative cross-section of the diphtheria immunity status of children of rural Virginia, a study was undertaken in 5 different counties representing the most typical geographic, economic, and environmental differences which might influence the

development of naturally acquired immunity to diphtheria.

The variation in the immunity of children giving no history of previous immunization in these 5 different counties is shown in the age groups 5 to 9 and 10 to 14 in Figure I.

Buchanan County, having the highest percentage of Schick negative children, is a typical rural, isolated, mountainous county in southwest Virginia. With the exception of one village with a population of 800, there are no communities with over 100 persons. There were no hard surface roads in the county at the time of the study, and intercommunication is extremely limited. The population of the county in 1931 was 16,900. The death rate from diphtheria in 1931 was 21.6, the average death rate during the past 8 years was 36.4.

Orange County, having the second highest percentage of Schick negative children, is a typical progressive, farming county of north central Virginia. There are two incorporated towns of 1,381 and 462 population respectively. There is free intercommunication in the county and there has been extensive school consolidation. The population of the county in 1931 was 12,070. The death rate from diphtheria in 1931 was 0.0, the average death rate for the past 8 years was 4.0.

Pittsylvania County, having the third

* Read at the Second Meeting of Southern Branch, American Public Health Association in Richmond, Va., November 15, 1933.

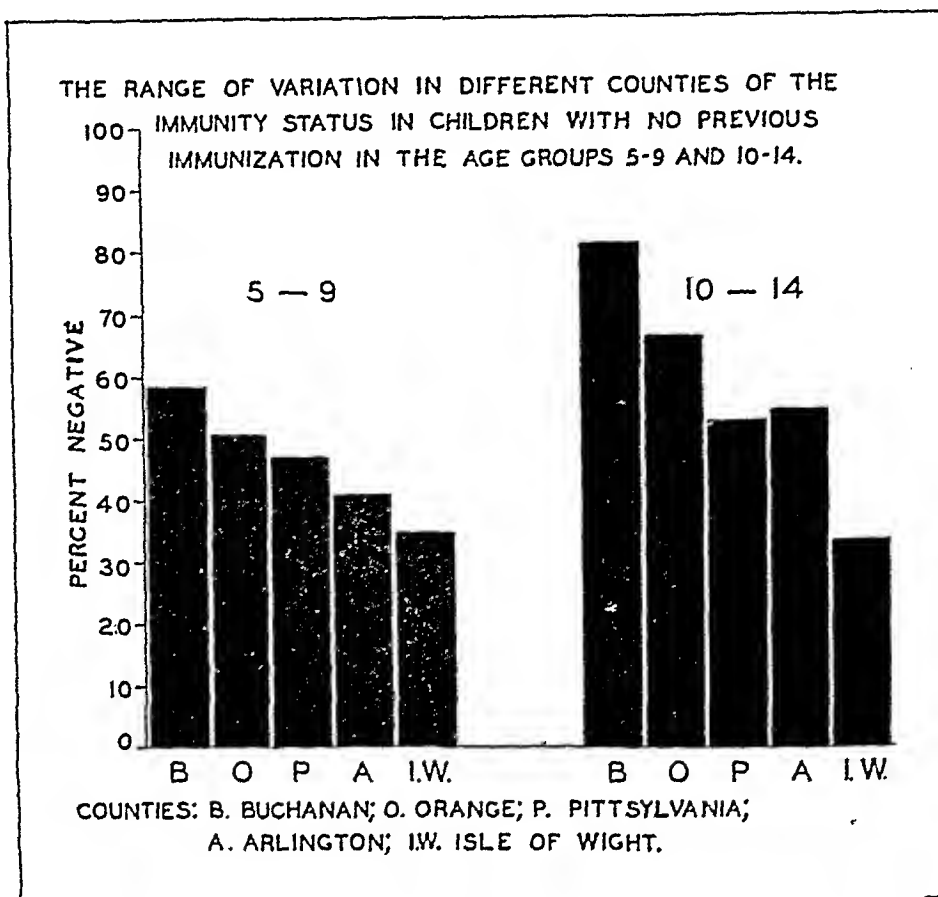


FIGURE I

highest percentage of Schick negative children, is a typical county of the cotton and tobacco belt. There is one city of 22,300 population which was not included in the study. The population of the county in 1931 was 62,000, 31 per cent of which were colored. The death rate from diphtheria in 1931 was 11.3, the average death rate from diphtheria for the past 8 years was 10.0.

Arlington County is a suburban county situated adjacent to Washington on the Potomac River and is populated, to a very considerable extent, by commuters to Washington. The population of the county in 1931 was 29,100. The diphtheria death rate in 1931 was 0.0, the average death rate from diphtheria in this county for the past 8 years was 2.8.

Isle of Wight, having the lowest percentage of Schick negative children, is

in the farming section of Eastern or Tidewater Virginia. There are no towns in the county of over 1,000 population. There has been extensive consolidation of the schools. The population of the county in 1931 was 13,400. The death rate from diphtheria in 1931 was 22.4, the average death rate for the past 8 years was 9.1.

The differences seen in the immunity of these different groups show quite clearly the necessity of the determination of the immunity status of any specific group when mass immunization is to be carried on. The differences in the immunity status in these counties cannot be easily explained. Approximately 10,000 children of all ages were Schick tested during the study in the 5 Virginia counties; approximately 6,000 of these gave no history of previous immunizing treatment.

Figure II shows the percentage of naturally Schick negative children in each year of age in this entire group of 5 counties. The usual rapid rise is seen in the curve during the first 6 years of life and very little increase in the percentage of Schick negative reactors is noticed in the age groups above 9 years. The roof of the curve is between 60 and 70 per cent and this roof is reached between 10 and 12 years and remains quite constant in the higher ages. It may also be seen that at 6 years (the usual age of school entrance in Virginia) about 50 per cent of the children are Schick negative. This would indicate that mass immunization of school children in Virginia without previous Schick test is not justified nor is it economical.

About 30 per cent of the children whom we Schick tested in our study had

had some form of immunizing treatment during the previous 5 years. The majority had been given toxin-antitoxin, although a few had received toxoid within the last 2 years.

Figure III shows a comparison of the immunity found in treated and untreated children in rural Virginia by years of age. The lower graph showing the percentage of Schick negative among those who gave no history of previous immunization is the same as that shown in Figure II. It is interesting to note in the treated children that there is no great change in the percentage of immunes after school age. The curve at that age is between 75 and 80 per cent, which is a drop from the original level and quite different from that seen in the group of untreated children.

In our work with alum precipitated

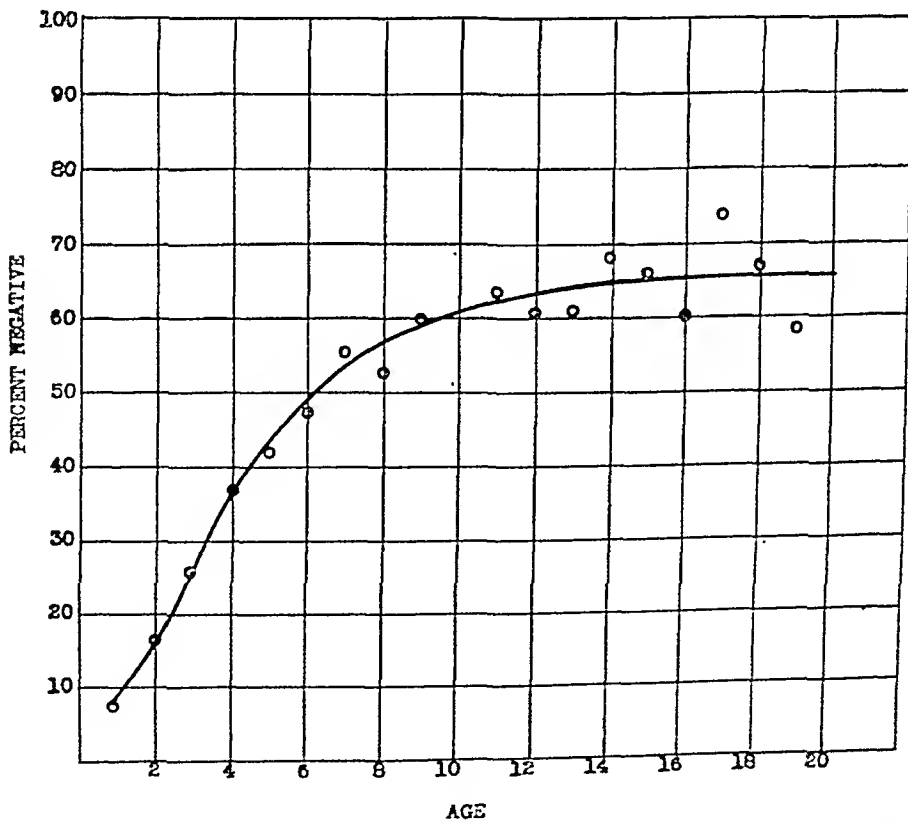


FIGURE II—The immunity status of rural children, with no history of previous immunization, by years of age

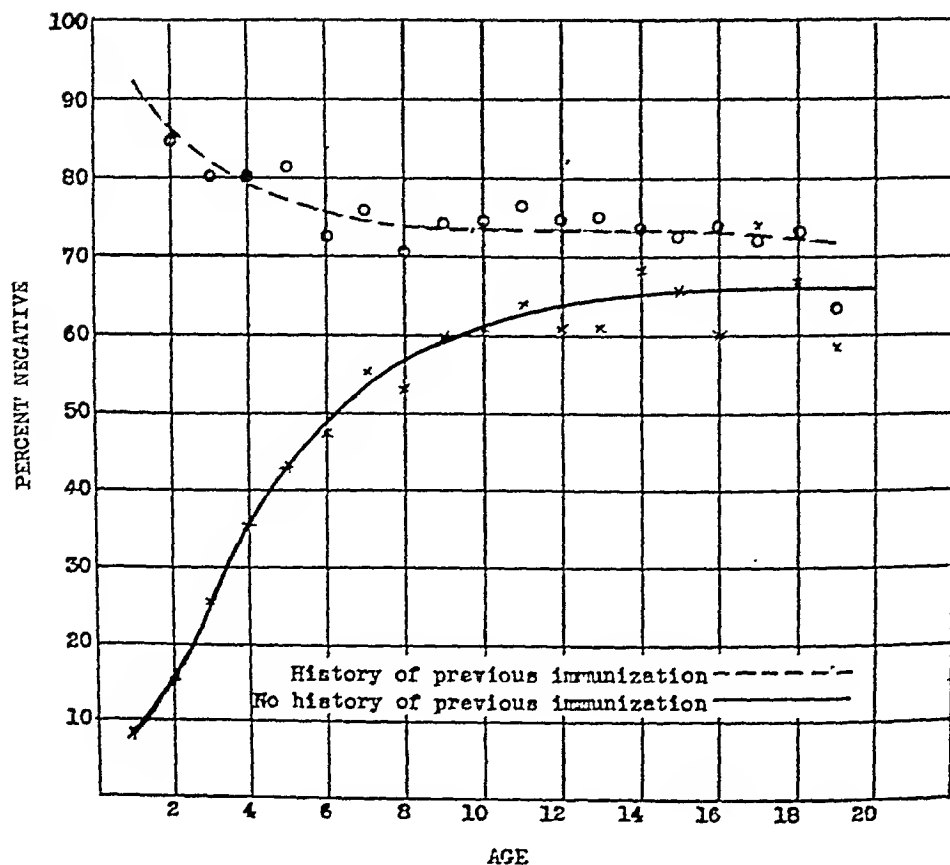


FIGURE III—A comparison of the immunity in children of rural Virginia according to history of previous immunization and by years of age

toxoid we have obtained 95 per cent immunity as against 60 and 70 per cent immunity obtained with toxin-antitoxin which most of these children had received. It will be interesting to observe whether this curve will remain higher in those immunized with alum precipitated toxoid than it does in this group immunized with toxin-antitoxin.

STUDY OF THE EFFECTIVENESS OF VARIOUS IMMUNIZING AGENTS

In 1913, Von Behring showed that diphtheria toxin neutralized or partially neutralized with antitoxin could safely be used for the immunization of humans. Since that time toxin-antitoxin mixtures have been used widely in the immunization of children against diphtheria and have undoubtedly greatly reduced the incidence of the disease in many groups. This method of immunization is reported to have

rendered Schick negative from 60 to 85 per cent of Schick positive children by various observers. The percentage rendered Schick negative by this method seems to depend somewhat upon the diphtheria experience of the community as well as the amount of toxin injected and degree of under-neutralization.

In 1923, Ramon showed that diphtheria toxin modified by the addition of 3 or 4 per cent formaldehyde and incubated at from 38 to 40° C. for from 4 to 6 weeks lost its toxicity but retained its antigenic properties. This product, known as anatoxin or toxoid, has been shown to be an effective immunizing agent. The degree of its effectiveness depends upon the potency of the product and upon the dosage and the time interval between doses.

As early as 1889, it was observed by Roux and Yersin that diphtheria toxin was precipitated by potash alum and

this substance was used in the purification of toxin. In 1926 Glenny, Pope, Waddington, and Wallace showed also that diphtheria toxoid was precipitated by potash alum and that the antigenic properties of toxoid so precipitated were enormously increased. Precipitation also makes possible a much greater concentration of the toxoid and the elimination of a greater amount of protein. Havens and Wells showed that one dose of completely precipitated toxoid produced an extremely high degree of immunity in guinea pigs. Graham, Murphee, and Gill report that 92.4 per cent of 185 strongly Schick positive children were rendered Schick negative by a single dose of this product and that 96.6 per cent of a group of 613 children whose immunity status was unknown were rendered Schick negative in from 2 to 6 months. Seventy-two per cent of the latter group were of preschool age.

In Virginia in 1931 the morbidity rate from diphtheria increased more than 100 per cent while the mortality rate increased about 60 per cent over the preceding 5 years. These increases occurred in spite of the fact that a diphtheria campaign had been carried on during 1928 and 1929 during which approximately 200,000 children had been

given three 1 c.c. doses of toxin-anti-toxin. This marked increase in the prevalence of diphtheria aroused considerable apprehension and served as a stimulus for a detailed study of the effectiveness of various forms of active immunizing agents.

During our study we have treated 447 Schick positive children with one dose of $\frac{1}{2}$ c.c. of toxoid containing 10 units per c.c.; 239 children with toxoid containing 10 units per c.c. with 0.2 per cent alum added; 375 children with two $\frac{1}{2}$ c.c. doses at weekly intervals of toxoid containing 10 units; 338 children with two doses at weekly intervals of $\frac{1}{2}$ c.c. of toxoid containing 10 units with 0.2 per cent alum added; 324 children with one dose of $\frac{1}{2}$ c.c. alum precipitated toxoid containing 12.5 units per c.c.; and 255 children with one dose of 1 c.c. of alum precipitated toxoid containing 12.5 units per c.c.

Table I shows the per cent of Schick positive children rendered Schick negative 6 to 9 weeks after the administration of various toxoid preparations.

There is no significant difference between the per cent of Schick positive children rendered Schick negative with one dose of toxoid with or without alum, nor is there any significant difference between per cent rendered Schick nega-

TABLE I

THE PER CENT OF SCHICK POSITIVE CHILDREN RENDERED SCHICK NEGATIVE 6 TO 9 WEEKS AFTER THE ADMINISTRATION OF TOXOID PREPARATIONS

Group	Toxoid Per c c.	Amount Given in c.c.	Number of Injections	Re-Schick Tests	
				Number Tested	Per Cent Negative
I.	10 Units	0.5	1	447	83.7
II.	10 Units with 0.2% alum	0.5	1	239	85.0
III.	10 Units	0.5	2	375	94.2
IV.	10 Units with 0.2% alum	0.5	2	338	95.3
V.	Alum Precipitated 12.5 Units	0.5	1	324	93.8
VI.	Alum Precipitated 12.5 Units	1.0	1	255	96.1

tive by two doses of toxoid at weekly intervals with or without alum. However, there is a significant difference between the per cent rendered Schick negative by one dose of toxoid with and without alum and two doses of toxoid with and without alum. There is no significant difference between the results produced by one dose of $\frac{1}{2}$ c.c. of alum precipitated toxoid and one dose of 1 c.c. of alum precipitated toxoid. As there is some difference in the age distribution in these various groups it seems advisable to take one age group where the numbers are large enough to be significant and compare the various preparations. As there is no difference between Group I and II, or between Group III and IV, or Group V and VI, they may be combined.

TABLE II

COMPARISON OF THE EFFICACY OF TOXOID PREPARATIONS FOR THE AGE GROUP 5 TO 9 AND COMBINING, FROM TABLE I, GROUPS I AND II, III AND IV, AND V AND VI

Groups	Number of Injections	Re-Schick Tests	
		Number Tested	Per Cent Negative
I and II	1	287	86.4
III and IV	2	285	95.4
V and VI	1	266	95.9

Table II shows clearly that one dose of alum precipitated toxoid is as effective as two doses of toxoid containing 10 units with 0.2 per cent alum added.

We realize that our experience is not very large and that there may be some geographical and environmental differences in the populations treated which may affect the production of immunity. In our experience there has been an apparent slight racial difference.

We realize that there are questions which may be raised concerning the details of the study. The first question, we believe, would be as to the standardization of the Schick test and the personal element in the reading of the test. All of the work has been done by the authors. We used Schick test material from one biologic firm. In order to check this material we used, as controls, heated toxin on 3,000 children. Dr. W. T. Harrison, of the U. S. Public Health Service, furnished us with a standard toxin sufficient to test 1,000 children and checked our technic. We gave two tests, one on each arm, to 1,000 children using the standard toxin on one arm and the commercial toxin on the other arm. The results checked perfectly with the two toxins. After watching us give and read 3,000 tests Dr. Harrison was satisfied with the technic used. A third question, which may be brought up, is the permanency of the immunity produced. It is our plan to follow as large a group of children as possible who have been immunized in order to determine the duration of the immunity produced by the various toxoid preparations.

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NOTE: We are indebted to Dr. William H. Park, of the New York City Health Department, for the toxoid and toxoid with alum added; and to the late Dr. Leon C. Havens, of the Alabama Health Department, for the alum precipitated toxoid used in this study.

Need for Uniform Practices in the Microbiological Examination of Food Products*

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THE presence of microörganisms in food products, with their influence upon quality and methods of preservation, is of great importance to food microbiologists. Not only have we learned the significance of the presence of some common types of bacteria, but we have found new organisms that are responsible for spoilage in products in which their presence had never been suspected. Control over pathogenic and infectious organisms is essential, but is not enough, since the quality and safety of many foods depend upon the control of spoilage bacteria, yeasts and molds.

With greater attention being given to the microflora of widely different types of food products, the necessity for standardization of the methods of microbial analysis is apparent. This is borne out by the experience of the U. S. Department of Agriculture and other agencies in the increasing number of requests for advice as to the most reliable methods of determining the microbic population of this or that food product.

Little effort has been made to unify the procedures employed in various laboratories. The methods of sampling,

culturing, incubating and interpreting the results are matters of personal choice. Nowhere are there available detailed directions which through wide and thorough study by many workers have been simplified and standardized for general use in the examination of many of the common food products.

Because of the interest in the proper control of the manufacture and handling of foods, it is natural that a movement to standardize laboratory procedures of this type should have its inception in our Association. A committee of the Food and Nutrition Section undertook to organize the work by developing coöperation between the American Public Health Association, the Association of Official Agricultural Chemists, and the Society of American Bacteriologists. The Society of American Bacteriologists appointed a representative to follow the work and coöperate where feasible; and the Association of Official Agricultural Chemists, after amending its constitution and by-laws to include microbiologists, appointed a referee to coöperate in the work. The Laboratory Section of our Association also appointed a representative to coöperate. Thus there has been organized a group of food microbiologists representing the major organizations in the field who will coöperate closely in developing standard procedures for the microbial analysis of foods.

* Food Research Division Contribution No. 198, read before the Laboratory Section of the American Public Health Association at the Sixty-second Annual Meeting in Indianapolis, Ind., October 10, 1933.

The value of standardizing the more common tests used in microbial food analysis is apparent when we consider the wide and insistent demand for such analyses. Every state in the Union conducts some type of official food analysis, and practically all cities of metropolitan size (500,000 population or over) maintain food analytical laboratories. Many college, university, and consulting laboratories are called upon to make analyses in which they have had but little experience, either with the food products, or with the special methods required. Standardization makes available uniform and accepted methods which will simplify the microbial analysis of food products. Reproduction of results by different laboratories is readily obtainable and their interpretation easily confirmed. Further, with accepted directions available in printed form, analyses would be made in laboratories where such tests are not now made.

Selection of the types of food or the methods of analysis requiring earliest attention is a difficult matter. What appears insignificant today may be of paramount importance tomorrow. In

general, foods can be grouped into several classes, such as canned foods, dried fruits and vegetables, meats and meat products, fermented foods, and marine products, so that, for the work under way, the development of methods for each class can be placed under the supervision of a laboratory worker well qualified in that particular field. In today's program we will hear from men who, because of long experience and familiarity with their fields, have been requested to review the present status of methods for the microbial analysis of certain types of products. These topics have been selected either because there is considerable information available, or because there is a special demand for information at this time.

The microbiological aspects of foods is of great economic importance, both from the standpoint of spoilage and deterioration and from that of public health. Standardization of laboratory procedures for such microbial examination is a present necessity and not only will aid in the better protection of the health of the consuming public, but pave the way for development of new and improved methods of food preservation.

Does the Press Want Health Statistics?*

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THIS has not been a difficult paper to write. First, it asks a question, "Does the press want health statistics?" and gives the answer, which is *Yes*. Second, it points out certain types of information, based on health statistics, which the newspapers like to use—both for news items and for editorials. Third, it endeavors to tell what profit the health departments and the public health movement in general gain through the use by the newspapers of health statistics.

I asked a friend, who is a newspaper man, why the newspapers of today give so much more space to "stories" based on health and medical statistics than was the case 20 or 30 years ago. "The answer," he said, "is easy. The newspapers want news and the vital statistics people are giving it to them. Every man," he went on, "consciously or unconsciously, watches his health, and speculates on his chances for a long life. He is interested—not only in the fact that the average length of human life is being prolonged, but in the details of how this is being accomplished. And don't forget," he added, "that no element in American life is more public spirited than the American press. The newspapers are perhaps the strongest allies of the public health movement."

How then may we, the members of the Public Health Education and Vital Statistics Sections, best capitalize the willingness of the newspapers to aid in public health education through public health publicity?

I wish that I had begun years ago to keep a record of the publicity given by the daily press to health items which were based on statistical data. I would like systematically to go over the files of the newspapers to determine the relative news appeal of items which have had their source in the statistical laboratories—the news appeal, as measured by the number of times the newspapers have published items on various health topics, and the number of lines and inches of newspaper space given to each.

In the first place, let me impress upon you that every state or municipal health department should endeavor to keep its records of mortality and sickness as nearly current as it is humanly possible to do. The newspapers prefer news to history. The daily papers in any given city, for example, would like to tell their readers *early* in 1934 whether the death rate of 1933 was higher or lower than that of the year immediately preceding. They would like to print, in January, the facts about the important causes of death—for, in January, they are news, whereas in July they are merely history. Is it practicable or possible, then, for the health departments to turn out current, or nearly current

* Read at a Joint Session of the Public Health Education and Vital Statistics Sections of the American Public Health Association at the Sixty-second Annual Meeting in Indianapolis, Ind., October 11, 1933.

vital statistics? Well, we in the Statistical Department of the Metropolitan Life Insurance Company do it for our mortality statistics, and we have a much larger population and a much more extensive mortality experience than any state in the country. In fact, in our Industrial Department alone, we deal with the deaths among approximately one-seventh of the entire populations of both the United States and Canada. The great City of New York does it, and the newspapers gladly print the facts given them because their timeliness gives them a definite news value.

By running back over rather fragmentary records and drawing on my recollection I am able to cite for you some of the subjects concerning which statistics have been widely published on account of their news value. It should be perfectly feasible for many state and municipal health departments to give out much similar information for their own communities. Regardless of whether your own health department is, or is not equipped to give out health particulars like those I am about to mention, I submit that all of them have a distinct public health interest. Here are some of these subjects.

1. The effect of tuberculosis on the average length of life, showing how much longer the average life would be in America if it were possible to eliminate tuberculosis. Various articles on tuberculosis with emphasis on its declining death rate, showing how this decline has been brought about; also the probability of further reduction, until tuberculosis may actually become one of the minor causes of death.

2. Heart disease as a fruitful field for preventive health work—showing the brighter side of the heart disease picture, namely, that the death rate is declining among children and young adults—and telling why.

3. Vacation typhoid — a warning against the shallow infected well, flies,

polluted milk, etc. Information of this type, obviously, should be given out shortly before the vacation season, with a reminder based on statistics, that the typhoid death rate is highest in August, September, and October.

4. Summer drownings—how to safeguard against them; methods of rescue, etc.

5. An analysis showing that poor teeth are an important cause of ill health, and that they frequently superinduce diseases which cause death.

6. Proving that public health is national wealth; that the well directed expenditure of money for the conservation of health will increase the wealth of the community more than any other equal investment of public funds.

7. A series of articles on the value of human life. These articles should stress such items as the cost of being born, of food, clothing, shelter, education, medical and dental care, recreation, etc., and point out the moral that every human being constitutes an investment and that his early death means an actual loss of money to the community.

8. What accident prevention, or reduction, means to a community.

9. What medical service in industry has accomplished.

10. Death as a factor in family damage—stressing the far-reaching consequences of the death of a parent.

11. Why tolerate diphtheria? A plea for immunization stressing the responsibility of the parents and pointing out how school superintendents can also help.

12. The value of periodic medical examinations.

13. Showing that accidental burns is the only form of violence that kills more women than men, and telling why.

14. The seasonal factor in mortality.

15. Accidental poisonings among young children, stressing, in particular, the danger which arises from leaving

pills containing strychnine where children can reach them; and the necessity for having warning signs and striking labels on containers.

16. A new field for the child welfare associations, pointing out how it is possible for the women of America to do as much to prevent accidents to children as they have done to conserve child health.

17. Child suicide. Back in 1927, there was a succession of child suicides. There was a lot of excitement about this until we in the Metropolitan gave the cold facts to the press, namely, that child suicides were, after all, of negligible numerical importance—that the actual death rate had been going down, for years, and that at the very time suicides among children were receiving so much publicity the child suicide death rate was only half what it had been 10 years before.

18. The origin of fatal accidents. How many in the home? How many in public places and in industry? Similar facts for non-fatal accidents.

19. An article on smallpox. Such an article was published in literally hundreds of newspapers because it showed that the only states where the smallpox situation had been at all serious were the very ones where our anti-vaccination friends had been the most active.

20. The prevention of maternal deaths—showing that through proper medical care and nursing two-thirds of them are preventable.

21. How cities may reduce automobile deaths. For example, questionnaires might be sent to safety officers in cities which had experienced notable reductions in fatal automobile accidents, asking how this was accomplished, and the summation of their replies given to the press.

22. An article showing that lower death rates mean fewer orphans.

23. The relation of body weight to certain causes of death.

24. Chronic lead poisoning in infancy, showing, on the basis of statements from a number of the country's leading pediatricists, that lead poisoning among infants is more prevalent than is generally known.

25. Fatal accidents in old age—where and how they occur.

26. The necessity of maintaining the public health services, Federal, state and municipal, at maximum efficiency during the depression.

27. The change in the rank of leading causes of death. Comparison with the facts of the first quinquennium of the century with the latest 5-year period.

28. Wet clothing and the common cold.

29. Showing that there has been a 40 per cent increase in life expectation within 40 years.

These are by no means all of the subjects on which it is possible to give to the press interesting, newsy information, based upon statistical studies.

Ladies and gentlemen of the Sections on Public Health Education and Vital Statistics, you possess a body of knowledge which, whether you appreciate it or not, constitutes *news*. The papers want facts like these. But here I must interject a note of warning. They do not want them in the form that they sometimes appear in your own reports. Your method of analyzing the most potentially newsy data may be scientific; but it may be excessively dull. The newspaper reporter, or the editor, is apt to be impressed only by its formidableness and to shy at the task of translating it into everyday United States. It would be a fine thing if every state health department, and that of every large city, could employ, on a part-time basis, a trained newspaper man to write "releases" for the daily press. In this way a world of public health publicity, now lost, would be forthcoming.

Now, what do the health departments gain, and how does the public health movement profit by the publication of news and editorial items on subjects like those I have mentioned? For one thing, it tends to strengthen community interest in the health services and to stimulate a public demand that they be adequately supported. Such publicity

constitutes the best kind of public health education; it tends to make the people more health-minded and more safety-minded; it thus promotes public and personal health and safety; and it is, accordingly, an important element in conserving and prolonging human life. These, I submit, are the objectives toward which we are all working.

N. T. A. Meeting in Cincinnati, May 14-17

THE preliminary program of the 30th annual meeting of the National Tuberculosis Association will be found in the March *Bulletin* of that organization, copy on request.

The program opens on Monday night, May 14, and extends through Thursday, May 17. The Clinical Section will meet in two sessions and a joint session with the Pathological Section. The joint session will be devoted to a symposium on collapse therapy treated both from the point of view of the pathologist and clinician. The Pathological Section will have three sessions. The Sociological and Administrative Sections have arranged their program in the form of a symposium. Among the topics to be discussed in the three Sociological Sections are: (a) Relative Values in Tuberculosis Work, with papers by

Jessamine S. Whitney and Bleecker Marquette; (b) Race, Sex, and Industry as Factors in the Tuberculosis Problem, with papers by C. Howard Marcy, James J. Stone and L. H. Ferguson; (c) Case-finding, with papers by J. B. Amberson, George C. Ruhland and Clarence L. Hyde; (d) Social Service in Tuberculosis Work, with papers by Paul L. Benjamin, and Ida M. Cannon; (e) A panel discussion with a group of speakers.

The Administrative Section will have two sessions including the following topics: (a) The Family Physician and Tuberculosis Control, with papers by W. S. Leathers, M. F. Haygood and John H. Peck; (b) How Effective is Health Education, with papers by Ruth Heavenridge, John Sundwall, and Mary P. Connolly. Headquarters will be in the Netherland Plaza Hotel.

Local Publicity Use of Statistics from National and State Sources^{*}

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IT is obvious that the local health officer is dependent upon state departments of health, upon the U. S. Public Health Service, and upon the large insurance companies for national and state statistics. He is under obligation to them for a vast and varied amount of important information otherwise unobtainable. How else could he compare his community's morbidity and mortality with that of other localities in the same class, or with the state's or the nation's as a whole? From this standpoint, he should be appreciative of the storehouses of facts opened wide to him by these organizations.

He is preparing, we shall say, for a diphtheria immunization campaign. He is familiar with the manufacture of toxin-antitoxin or toxoid and with the technicalities of administering it. But in order to convince his public of the need for the program, he will have to explain what is being accomplished in other parts of the county, the state and the nation. This information, if skillfully presented, can be made a principal feature of local newspaper items, pamphlets, bulletins, window exhibits and of talks both before clubs and person-to-person.

If he were obliged to assemble the data for such a purpose, his department

might as well give him a year's leave of absence and employ another health officer. As it is, he has merely to write his state department of health. It is as easy as that to obtain statistics on innumerable public health subjects. In fact, it is so simple that we are prone to take too much for granted the labor involved in the compilation of such statistics.

From another standpoint—that is, from the standpoint of releasing statistical news to the press—I sometimes wish the national and state organizations were less prolific. One reason is this—Health officers are coming to understand more and more the desirability of planning their publicity. We are possibly 25 years behind the times in this; certainly we are far behind the commercial agencies; but I believe we at last see the need for having a system in our publicity as well as having a system in, for instance, our schemes of communicable disease control.

The press will allot about so much and no more space to news from the public health field, except, of course, in times of epidemics. Suppose, then, a local newspaper receives simultaneously one news release from the state, or the U. S. Public Health Service, or the Metropolitan Life Insurance Company, and one from the local health officer. Which will the editor consider of greater significance? The first one. Distant pastures are greenest, you know. The release may happen to be

^{*} Read before a Joint Session of the Public Health Education and Vital Statistics Sections of the American Public Health Association, at the Sixty-second Annual Meeting in Indianapolis, Ind., October 11, 1933.

on the subject of Rocky Mountain spotted fever, of which disease the city never had a case. The health officer's news may happen to be of a preschool examination clinic being held preparatory to the fall term of school. Ten chances to one, the first item will be printed. Readers will thereby receive a vague impression of a disease remote to them in any case; and parents of preschoolers will miss the urgent news that here is an opportunity of learning whether or not Johnny is in fit physical condition to begin school.

From still another standpoint, I often wish the national and state organizations were more conservative in releasing statistics. It is their tendency to make health conditions appear very fine. We read something like this—"Years of life wrested from tuberculosis—Very considerable declines in the mortality from tuberculosis and pneumonia are the most important items on the favorable side of the 1933 health record, to date." (1) If you are doing public health work in the field, you will appreciate that such an item, if published inopportunistically, would not help a local health officer in an effort to increase his appropriation for tuberculosis work. Neither would it help to draw to the reader's attention the still too great incidence of both tuberculosis and pneumonia.

Or, for instance, we note this, "New low for milk-borne epidemics—The year 1932 closed with a new low record for milk-borne outbreaks." (2) Reading this desultorily, as the typical newspaper reader does, would not place him in the frame of mind to lend support in a campaign for pasteurized milk.

Or we find this, for example, "Notwithstanding the continued depression . . . the health of the people of this state during the year 1932 has in general been most favorable." (3) A local board of health might be pardoned for considering it allowable in the light of

this news to reduce its budget, even though, perchance, their health officer knew conditions in that particular locality to be much less favorable.

I am not overlooking the fact that elsewhere in these representative articles, the other side of the picture is touched upon. Nevertheless, the best angle is featured. We, as public health enthusiasts, will read all of the articles if printed in full. But what of lay readers? It is a well known fact that many persons read only the first part of news items. Furthermore, newspapers usually caption the good points and pass quickly over such news as a gradual increase in deaths from certain causes, unless it is great enough to be alarming.

People assume there is nothing to worry about. Everything is being adequately taken care of by health authorities—all of which is precisely the attitude which should not be created. The larger number of persons we can interest in public health to the extent of doing something about it, the swifter progress we shall make.

It is probably all right for the state departments and large insurance companies to emphasize the stupendous saving of lives effected by their public health activities. But how are health officers to secure funds for their work when the big boys save so many lives on paper?

There is another angle from the standpoint of news releasing by insurance companies. The lay reader fails to appreciate the point that such figures are not on an actual cross-section of the population, but are on policyholders who constitute more or less selected risks. As far as the lay reader is concerned, statistics from the state and Public Health Service, and from the insurance companies are identical.

In the publication of statistical news, I feel health officers could assist in adding local color and educational value

in the following way. If, instead of sending a release direct to the press, the large organizations would forward it first to the health officer, he could determine whether or not that particular time were the opportune time to publish it, and if so, add figures and suitable material for his community.

It seems logical that lay readers are likely to assimilate a more enlightening and useful bit of information when statistical news of a nation-wide and state-wide character is accompanied by items relating to their own corner of the world. This is on the assumption, naturally, that the health officer will present his share as well written as the others, and that he will calculate sickness and death rates on the same scale or at least with variations explained so as not to confuse readers.

You will gather from this paper that I would like to see put into effect a concurrent and well devised system of releasing statistics by the national, insurance, and private agencies and the local health departments. Statistics, being as they are a highly complex and technical subject, need to be given the public in small, timely and wisely measured doses. They are meagerly understood except by the small group who specialize in their study. Why should that group flourish before the eyes of the rank and file figures and facts which mystify but do not benefit them?

After all, public health education is the only worthwhile reason for publishing statistics for the mass. And the group of persons skilled in the art of presenting statistics educationally is as small as the group who calculate them. It seems paradoxical that organizations which would not dream of releasing any but the most mathematically correct statistics will, nevertheless, release them unrestrictedly.

What will have taken place in the releases concerning epidemic encephalitis

by the time this paper is read I do not know. But I do know that during the first few weeks of St. Louis's unfortunate experience with this disease the newspapers have carried many accounts concerning the number of cases and deaths therefrom. The following is typical of releases from state departments of health:

Figures made public by blank department of health show that for blank number of years blank number of cases and deaths were reported annually from encephalitis. The 10-year average for blank city was blank number of cases and for the remainder of the state blank number. Blank number of cases were reported during the first 9 months of 1933, and blank number for the remainder of the state. On the subject of the apparent increase in prevalence of encephalitis there has been a change in the proportion as compared with that of blank year. Prior to 1931 blank city's cases and deaths exceeded in numbers those reported during such and such a time. So on and on, *ad nauseam*. Twenty-five lines of this ended by the following vague statement: "The cases and deaths have not increased in numbers so that the changes which have taken place in the geographical distribution of encephalitis in blank state do not appear to be of any special significance."

The gist of this release could have been told in 12 words, thus: Cases of epidemic encephalitis are not on the increase in this state. The remaining 23 lines could have been utilized to brief for the reader what he actually needs to know—*i.e.*, the symptoms of the disease and what precautions if any he could take against it.

It is because of inappropriate stuff such as this, as well as the unseasonableness of many statistical releases, that I believe we need a new and better system. Such system would be directed toward making statistics not mere idle

news, but an essential part of public health education.

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DISCUSSION

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DR. Shelley represents, I regret to say, a comparatively small but rapidly increasing minority of health officers in New York State who appreciate the desirability, nay, the necessity of the use of publicity in order to accomplish their objectives and maintain a successful fight against opposing local forces. He is a frequent, adept, and welcome user of statistics and other data compiled by the State Department of Health. He knows what he wants to use and how to use it to best advantage. He is right that health authorities are far behind commercial agencies in this matter. We must learn to adopt such of their methods as are ethical if we are to sell health promotion and disease prevention methods to the public.

I do not altogether agree that newspapers will allot so much and no more space to news in the public health field. The amount of space they will give free depends on the amount of live, up-to-the-minute news that can be produced. That is what establishes the limits—not the available newspaper space. But this brings up the question, why should not health agencies, official or otherwise, buy advertising space? It is effective and is a legitimate charge.

I am inclined to disagree also as to which news release a local newspaper would take—one from the local health officer or one from the state, or the Metropolitan Life Insurance Company.

A local newspaper wants local news first of all. Again, it depends on the facts and how they are presented. An attempt should be made to localize general stories whenever possible. When this is done, it is almost sure to receive good publicity.

Regarding the statement relating to playing up favorable facts on mortality and morbidity—if the general health trend is favorable, you can do no less than tell the public the true situation. On the other hand, constant playing on the unfavorable side alone soon produces the reaction of crying "Wolf! Wolf!" The newspaper, in fact, is always looking for the alarming facts and will play them up to the exclusion or partial eclipsing of the favorable points.

I would, myself, like to see a more coördinated system of health news releases, but see little hope for it in the near future.

Dr. Shelley criticises an encephalitis release by a state department of health. While he mentions no names, I admit that I edited and published it. His quotation, however, is practically verbatim from our weekly bulletin, *Health News*, which is published primarily for health officials and other health workers. When it appeared in release form, it opened, exactly as Dr. Shelley recommends, with a statement that there is as yet no evidence of any epidemic of lethargic encephalitis in New York State and that the prevalence

of the disease in the state had remained low thus far.

With his further suggestion that an outline of symptoms should have been substituted for statements relating to the comparative number of cases in the

state, I certainly do not agree. Since the cases were few and no epidemic existed why unnecessarily alarm the public with a list of symptoms—useless information which the newspapers would not print under existing circumstances.

Work of the National Children's Bureau in Costa Rica

THE National Children's Bureau of Costa Rica, established in 1930, has been laying a foundation for a comprehensive system of social aid, as described in its recently issued second annual report. Several months ago the Bureau took a census of working children, particularly those in street trades; work permits and attendance at afternoon or evening schools were made compulsory for working children; and through a corps of social workers contact was established with the families of working children and of other children in need of attention. The Bureau was instrumental in the enactment of child labor regulations, and it is now enforcing these regulations. A register is kept of the children engaged in street trading and in habitual begging; each case of begging is investigated, and measures for dealing with this problem in general are studied.

The Bureau has made a survey of the neglected children and has been active in the enforcement of the school at-

tendance law as regards these children.

The Children's Bureau exercises supervision over the institutions for dependent, neglected, and delinquent minors. Among those institutions may be mentioned orphan asylums, reformatories for boys and girls, institutions for homeless or neglected girls, child health centers, children's clinics, school lunches, a day nursery, and a vacation colony for school children.

The law requires the Children's Bureau to exercise protection over the health of mothers and children, and the Bureau has already formed plans for such work.

In compliance with another law, the Children's Bureau sends representatives to testify in all court cases involving minors. It also drafts child welfare bills. The Children's Code was passed by the Costa Rica Congress soon after its introduction and is now in effect. Other bills are pending.—*Boletín del Patronato Nacional de la Infancia*, San José de Costa Rica, 3, 16-18, 1933.

Safeguards in the Publicity Use of Vital Statistics*

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THERE are a number of witticisms, now worn rather threadbare, concerning the veracity of statistics and their users, which, in company with most statisticians, I should prefer to ignore in this paper. It does, however, seem desirable to allude to them, partly because they are sometimes quoted to the wrong effect, but mainly because they call attention to certain issues that merit discussion.

The first of these aphorisms, possibly from the pen of Josh Billings, says that "Figgers don't lie; but liars figger." This accusation was, no doubt, originally intended for gentry of the type of the gold-brick salesman, whose "statistics" were written on cuffs and the backs of envelopes for the benefit of his intended victim; but it is true that the charge of fallacious "figgering" applies also with considerable force to a large group of well intentioned persons.

What often happens is that an individual becomes possessed of a given conviction, and wishes to bring others to the same view; but it is not always very convincing for the propagandist simply to say: "It is my belief and that of my associates," so he seeks statistical support for his message. Statistics are complex in their meaning; Yule

has appropriately defined them as numbers affected by a multiplicity of factors. This means, for example, that the death rate of a city depends upon the age, racial, and vital state of its inhabitants; industrial, economic, and climatic conditions; medical care, public health supervision, hospital facilities, and certain distorting factors which will be alluded to later. Descriptions of other social phenomena are equally complex, whether numerical or not.

To reason correctly from such complex data is not easy, and even the most acute and careful persons will at times fall into error in the process. But no confusion can be quite so profound as that of the individual who rushes into this maze with the intention of finding support of a preconceived idea. It is truly remarkable how, under the influence of a desire to prove an *a priori* conclusion, the critical faculties of persons of honest intentions can become benumbed so that faulty data and insufficient reasons will pass muster, if favorable to the cause of the searcher, whereas antagonistic evidence will often be ignored, upon one pretext or another.

A number of years ago the writer began keeping a file of statistical errors encountered in medical and public health publications, in the hope that their analysis might be of help in his teaching. Although there are some disadvantages to the method of teaching truth by presenting error, it will perhaps be helpful to give a few examples from

* Papers from the Department of Biostatistics, No. 189. Read at a Joint Session of the Vital Statistics and Public Health Education Sections of the American Public Health Association at the Sixty-second Annual Meeting in Indianapolis, Ind., October 11, 1933.

this morgue of statistical errors, to bring out certain points of this paper. As the mistakes are of a type that might and do occur to any one of us, it would be rather unfair to publish the names of the few authors who happen to fall into this particular selection; the names will, therefore, be omitted from this paper, except that I admit that one of the mistakes is my own. The first example illustrates a pitfall that has trapped more than one writer:

Example 1—A public health writer states: "In Chile, in 1911, 6 children died during the first year of life out of 20 born; . . . in New Zealand, . . . only one in 20 died. In the last named country each infant had six times as many chances to survive, as did an infant in Chile."

The statement that because the proportion who die is reduced to $1/6$ of a given value, the proportion who survive is multiplied by 6 is incorrect; it is comparable to a claim that if a frugal housewife reduces the wastage in her apple parings to $1/6$ of the original parings she will multiply her yield of apple-sauce by 6, which claim would, of course, be nonsense. Actually, since in New Zealand 1 died out of 20 born, 19 must have survived; and since, in Chile, 6 out of 20 died, 14 must have survived. The chances of surviving were therefore, in the ratio of 19 to 14, or 1.35 to 1, and not 6 to 1, as the author stated. Incidentally, even the 35 per cent advantage of New Zealand was abundantly worth while; the unconscious exaggeration was as unnecessary as it was incorrect.

The example is cited to illustrate the insidiousness of the friendly or dramatic statistics. Presumably, the author of Example 1—a man of exceptional abilities—merely did not stop to inquire into the true relationship between mortality and survivorship. If, however, the comparison had clashed with his views; if, for example, it had indicated that the nation with the more advanced health

administration had the poorer survivorship rate, the statement probably would have been challenged, and the error promptly detected.

Public health certainly aspires to as high an ideal as is professed by business: Truth in Advertising. To that end, the first safeguard proposed in the publicity use of statistics is to try to be more critical of the materials and of the reasoning which favor our cause, than of those which oppose it—*more* critical, because otherwise we shall certainly not be critical enough; the instinct to defend one's beliefs and interests is so strong that desire too often pulls the wool over the eye of reason.

ACCURACY OF STATISTICS

Although the epigram imputed to Josh Billings exonerated the figure and indicted the figurer, some unknown person said, "There are three kinds of lies: lies, damn lies, and statistics." It is, of course, important to draw a distinction between, say, the figures collected by a disinterested governmental agency, and the estimates of the newspaper reporter, the enthusiast, and the partisan.

I was once greatly cheered to hear a statistician engaged in social surveys say that he longed for data that were as complete and accurate as registration returns, such as vital statistics; nevertheless, our field does have inaccurate statement and incomplete registration to contend with. Besides these difficulties are some that arise from classification, *e.g.*, as to residence and cause of death. The residence distortion is by far the most important. As an extreme example, DePorte¹ mentions that the recorded death rate for the rural part of Dutchess County, N. Y., was more than 10 times the true resident rate, due to the presence of many hospitals and institutions.

It should be emphasized that statistics can be very useful in spite of

their inaccuracies, if used with due regard to their limitations. The current encephalitis reports, for example, may be in error by 25 or 50 per cent; yet they convey an important message. As distortions will ordinarily vary more from place to place than from year to year, it is sometimes preferable, if practicable, to make comparisons between different years than between different places.

There is an enormous difference in the trustworthiness of vital statistics of various sorts. In some instances, the compilers of these statistics have, or could obtain, tolerably good information as to the accuracy of specific statistics, and it is a great pity that this information is not oftener passed on for the benefit of the user of the statistics, for without it the statistics can indeed be most misleading.

Registrars and others are constantly laboring to improve the accuracy of their statistics, and this activity is laudable and should be encouraged. But, in my opinion, the greatest need before the vital statistics profession today is that of measuring the accuracy of their statistics, and of placing the results before those who use them. One may ask, "How can the accuracy be known if the true statistics are not known?" The answer is that the accuracy of the count may sometimes be determined from a more precise count of samples, or from related statistics of a higher order of accuracy. Examples of the determination of accuracy have been published (Refs. 2 to 7), but the ground has hardly been scratched.

For the user of statistics the second safeguard here suggested is to know the origin, meaning, and accuracy of the statistics used, or to go to some one who does know.

NUMERICAL ADEQUACY OF STATISTICS

For want of space, this subject can hardly be more than mentioned. It is

treated in most textbooks under such headings as probable error and sampling. To the casual user of statistics the following simple suggestion may perhaps be of value: An increase in the tuberculosis rate from, say, 50 to 60 per 100,000, may or may not be noteworthy, depending upon the size of the population involved. Thus, for a city of 1 million, the rates cited would imply a change from 500 to 600 deaths, *i.e.*, an increase of 100 deaths, which no sensible person would take lightly. But for a city of 10,000 the change would be only from 5 to 6 deaths. No smaller increase could be stated; the difference, although equal to 20 per cent, is clearly of little moment.

It is an excellent precaution, thus, to look at the *number* of cases, deaths, etc., as well as at the rates.

REASONING AND STATISTICS

We turn finally to a consideration of the logic associated with statistics. It was Thomas Carlyle⁸ who wrote: "A witty statesman once said that you might prove anything by figures." Carlyle was referring at the time to the inaccuracy of statistics, but a powerful inciting cause of the epigram today is certainly the loose reasoning that sometimes goes with the statistics, particularly the form of statement designated by Kant as *post hoc, ergo propter hoc*—after this; therefore because of this.

The basic difficulty behind very many errors of statistical reasoning is, I think, the tendency to consider only one, or a few, instead of all of the important factors that might affect a result. Let an example illustrate:

Example 2—An epidemiologist once went to his health officer with the statement that a certain group of beginning typhoid cases were doubtless attributable to oyster infection, since some 80 per cent of the cases gave history of having eaten raw oysters. "But," objected the health officer half jokingly, "100 per cent of them drank the city water!" (The health officer's jest had more point than he thought at the time; for it later became

apparent that the year before, there had been a small oyster-borne epidemic, and a small water-borne epidemic, concurrently.)

The epidemiologist was, of course, logically justified in suspecting oysters, but his case, as he presented it, savored strongly of *post oysters; ergo propter oysters*. The fact that oysters *might* have been responsible was no evidence that they *were* solely, or mainly responsible, and not water, milk, or other vehicles of infection. It is a fundamental theorem of scientific procedure that a given explanation cannot logically be accepted as the preferable one, unless all other reasonable hypotheses have been eliminated.

Statistical logic ordinarily improves as it approaches that of the experimental method, and the use of control populations. To revert to the last example, the hypothesis of oyster infection was more firmly established, when it was shown that the attack rate was enormously higher among consumers of Oyster A, than among controls, composed of consumers of any other brand of oyster distributed in the city. Elimination of other likely agencies of infection completed the case.

Out of the study of published errors came the interesting and constructive suggestion, that a large majority of the fallacies occurring in the use of statistical material would be avoided, if the components of even the simpler types of rates were more generally recognized, and some fairly elementary precautions taken concerning them. Even persons with extensive statistical experience sometimes come to grief for want of these precautions; the examples of this paper support this statement. In connection with ordinary time-rates, such as the death rate, it is necessary to think not only of the deaths or cases, but also of the total population universe involved, *i.e.*, the population at risk. Other important factors, though not all, are the duration, and intensity of ex-

posure to risk. Let an example illustrate the importance of focusing attention on the population at risk.

Example 3—In an examination of candidates for auto drivers' licenses, it was asked "Are accidents more frequent on rainy days than on sunshiny days? Why?"

Many persons answer that rainy days have more accidents, because of slippery roads, lower visibility, etc. Actually, however (as the examiners point out), there are more accidents on sunshiny days, the chief reason being that there are more persons in cars and on the streets on pleasant days; in other words, the population exposed to risk is larger. Another factor perhaps is that on clear days people drive less cautiously.

The next example emphasizes in another way the importance of giving thought to the population exposed to risk.

Example 4—During the decade 1910 to 1920, the mortality rate from malaria increased in the registration area about 50 per cent. Does this mean that the risk of dying from malaria in the United States really increased by that proportion?

It does not, even assuming that the accuracy of diagnosis remained unchanged during the decade. The registration area increased during 1910-1920 from 21 to 34 states. The original states were almost all in the North, and the subsequently added ones mainly in the South, where malaria is most prevalent; the addition of these malarial states caused the rate in the total to rise, hence the malaria rate in the total area rose with time. The example illustrates the importance of bringing compared populations into conformance on essentials. Not only climate, but age, race, sex, etc., should usually be considered in this precaution of making the exposed to risk populations reasonably comparable.

The last example will illustrate the importance of selecting the particular

rate which is capable of answering the question under discussion.

Example 5—It was pointed out that during recent years, the death rate for the age group 1 to 4, had declined more rapidly than had the death rate under age 1. Subsequently, another individual pointed out that this seemed to indicate the futility of infant welfare work, since the age zone of greater welfare activity showed the smaller decline in mortality.

The second person's confusion was partly due to a convention in vital statistics practice that is sometimes troublesome; namely, that of taking as the standard unit, all mortality under age 1. There are operative in that age zone two very different sets of forces for mortality. During very early infancy—certainly under 1 week of age—the dominant mortality factors are essentially congenital or prenatal. Later, however, the environmental factors enter more largely—care, feeding, and the like. Against these environmental forces, the public health campaign has, thus far, apparently been much more successful than against congenital factors. As the deaths of the first day of life, alone, now constitute, in large cities, nearly a fourth of the mortality of the entire first year, it is clear that the ordinary infant mortality rate is loaded with a heavy weight which tends to mask the effect of the life savings in the later months of infancy.

One moral from this is to refer oftener to infant mortality in several subdivisions under age 1; and if a single infant mortality rate is to be referred to, often it had best be the mortality at ages of infancy after 1 month, or possibly after 1 week.

We have seen that in each of the examples cited there was confusion with one of the several elements of a rate. In the Chile-New Zealand example the meaning of the so-called numerator population—survivors—had apparently been mistaken; in the oyster typhoid

example, the population at risk had not been contrasted with control populations; in the auto accident example the population at risk had been ignored entirely. In the malaria example, important changes had crept into the population at risk—changes which the uninitiated might easily have overlooked.

The fundamental question concerning any rate or index is: "Does it really measure the risk which we wish to discuss?" To answer this question we must scrutinize, not one, but all of the elements that enter into the rate. We have seen that in practice, fallacy hinges exceedingly often to the population universe, *i.e.*, the population in which the cases, deaths, etc., occur. It is therefore extremely important to ask: To what extent is this population really exposed to the risk under consideration? Is it suitable from the standpoint of age, race, climate, occupational hazards, and so on? Is the population large enough to be representative?

Almost anyone will, I am confident, take a long step toward the sounder use of statistics, if he will analyze in this way the elements of, say, 25 rates encountered in his reading, defining clearly each element of the rate, and evaluating its adequacy for the purpose at hand.

In summary then the following safeguards have been suggested, in the use of statistics for publicity, or otherwise. There are, of course, others of importance which cannot be discussed in a brief paper.

1. Try to be more critical of that which favors your viewpoint than of that which opposes it.

2. Know the origin, meaning, accuracy and sufficiency of the statistics used.

3. Scrutinize, not one, but all of the elements of the rates used; give particular study to the population at risk.

4. Avoid the *post hoc* method of argument; try instead to approach the experimental method, including the use of control populations.

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Prenuptial Health Centers in Uruguay

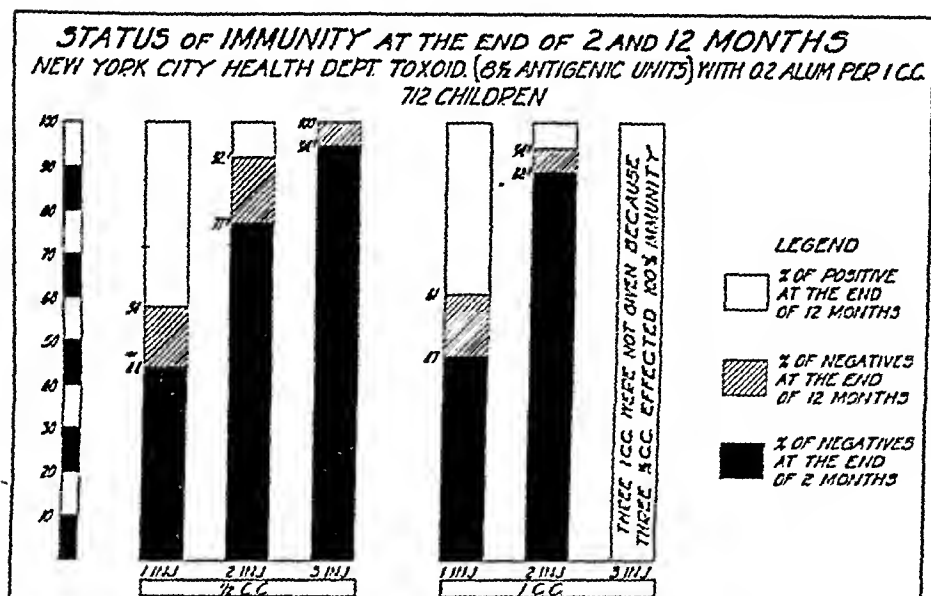
CENTERS for the physical examination of persons intending to marry, called prenuptial health centers, were established in Montevideo, Uruguay, several months ago. A little later the National Council of Public Health, an official body, ordered that such a center be established at the earliest opportunity in each rural hospital or medical-aid station in the country. Measures for familiarizing the public with the work of these centers were also prescribed.

In the examinations particular attention must be paid to venereal diseases, tuberculosis, and certain other diseases, transmissible or hereditary. A

person free from such diseases is given a health certificate; otherwise no certificate is issued. The certificate must be presented to the registrar of marriages and must be noted on the marriage record. If no health certificate is presented, the registrar must suggest a physical examination, although the examination is optional.

The physician in charge of each center is required to report at certain intervals to the prenuptial health center in Montevideo, which is to supervise the work of all the centers.—*Boletín del Consejo de Salud Pública*, Montevideo, 1933, 2, 7, *Diario Oficial*, Montevideo, 1933, No. 7978.

CHART II



Both preparations of toxoid used in the above study had the same antigenic potency and both groups of children were comparable in every respect.

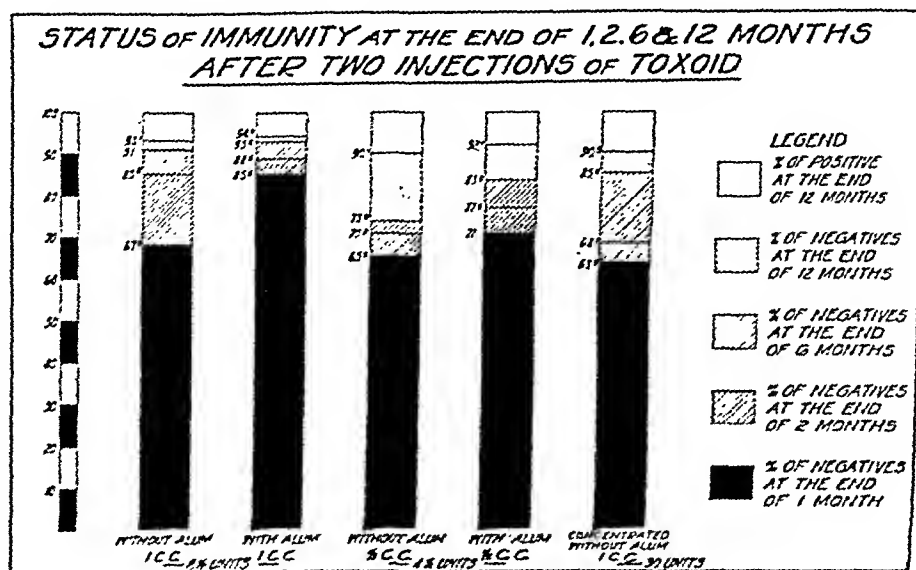
The stability of toxoid with alum was shown by the fact that half of our lot was stored for 7 months and results were slightly better from the older preparation than from the fresh.

A comparison is shown in Charts I and II of the results obtained by one, two, and three injections of toxoid with and without alum.

A higher degree of immunity is developed more rapidly by toxoid with alum than by toxoid without alum, a point of considerable importance at all times and particularly when diphtheria is prevalent in a community. The percentage of negatives obtained with two injections differs little from that obtained with three, and as the two injection procedure is simpler, we prefer the two injections of toxoid with alum.

Chart III shows the highly satisfactory results of two injections both with

CHART III



and without alum and the trend of development of immunization 1, 2, 6, and 12 months after. One c.c. doses produced better results than $\frac{1}{2}$ c.c. doses with but a slight increase in local reaction.

MICHIGAN TOXOID

Results from the Michigan Department of Health preparation of toxoid containing $7\frac{1}{2}$ antigenic units, were observed on 576 children.

One injection—The results of one injection of $\frac{1}{2}$ c.c. or 1 c.c. of toxoid were not satisfactory:

NEGATIVES EFFECTED BY 1 INJECTION

Interval since last injection	$\frac{1}{2}$ c.c.	1 c.c.
2 months	40%	42%
12 months	57%	61%

Two injections—The use of two injections of toxoid showed considerable improvement over one injection. One c.c. doses effected a slightly higher per-

centage of negatives after the 12th month:

NEGATIVES EFFECTED BY 2 INJECTIONS

Interval since last injection	$\frac{1}{2}$ c.c.	1 c.c.
2 months	71.0%	71.9%
12 months	82.3%	86.4%

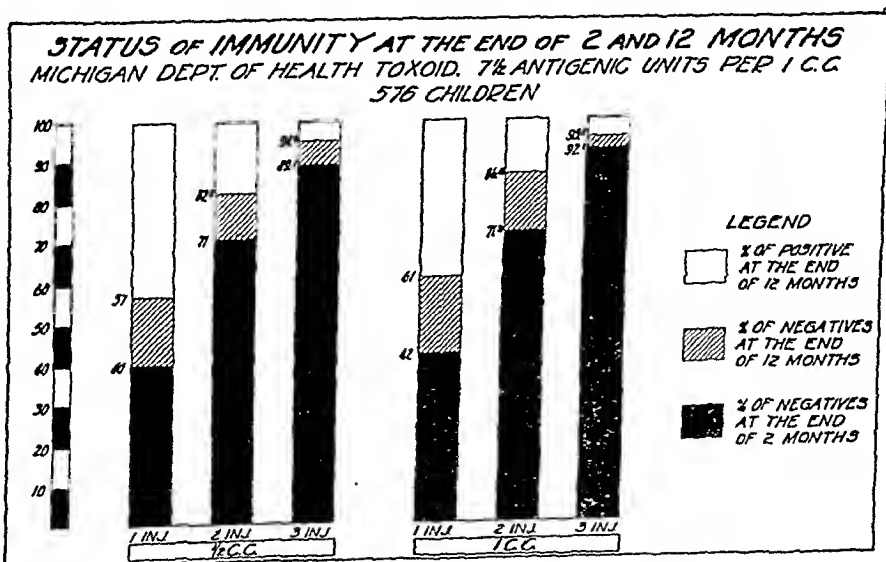
Three injections—The use of three injections of toxoid showed considerable improvement over two injections. Apparently three $\frac{1}{2}$ c.c. injections are as effective as three 1 c.c. injections:

NEGATIVES EFFECTED BY 3 INJECTIONS

Interval since last injection	$\frac{1}{2}$ c.c.	1 c.c.
2 months	89.1%	92.1%
12 months	94.9%	95.2%

Results from one, two, and three in-

CHART IV



jections of Michigan Health Department toxoid are shown in Chart IV.

It is well known that numerous visits in connection with the immunization of a child undoubtedly prevent the family physician from becoming paramount in the immunizing problem. Until toxoid is perfected, this disadvantage might be overcome to some extent by the following procedure which we used with satisfactory results on 210 children:

The Schick test was given and, if no history of previous immunization was elicited, an injection of toxoid was given at the time of the first visit. The Schick test was read after 1 week and if positive, the second injection was given.

MICHIGAN CONCENTRATED TOXOID

At the suggestion of Young we studied the results of using a concentrated toxoid containing 30 antigenic units per c.c. on 229 children. Only two injections of the concentrated toxoid were given.

As shown in Chart III, the use of two 1 c.c. injections of concentrated toxoid resulted in a lower percentage of Schick negative children than two 1 c.c. injections of regular toxoid.

REACTIONS

In evaluating the degree and frequency of reactions a questionnaire was sent to the parents of each child immunized, requesting them to describe the nature, degree, and duration of the reactions either local or general. Redness, swelling, and pain were listed under local reactions; and headache, general malaise, nausea, vomiting, fever, and skin eruptions under the heading of general reactions.

Letters were sent to the parents of 1,456 children from whom 972 replies were received. The parents of 34 per cent failed to report, probably because no reactions were apparent.

As reactions were observed only by the parents, interpretations are perhaps not perfect, though it is reasonably certain that severe reactions were correctly reported.

Chart V shows a detailed tabulation of reactions. Toxoid with alum gives 7 per cent of moderate and severe general reactions as compared to about 4 per cent from the same preparation without alum. Moderate and severe local as well as general reactions were 3 times more frequent from concentrated toxoid than from any other preparation.

Ray, Janney, Schwartz, and others report a few instances of the development of asthmatic attacks after receiving toxoid, probably due to sensitiveness to diphtheria proteins or veal broth used in the growing of diphtheria bacilli.

In our group we observed one attack of severe character:

March 10, 1932, a boy age 10, had a Schick test with control. Reading 1 week later was positive. April 27, the child received the last injection of $\frac{1}{2}$ c.c. of toxoid without alum, followed by no local or general reaction. June 2, the child received the final Schick test. One-half hour later the lips and eyelids became swollen, the child became cyanotic and short of breath. Urticaria appeared over the entire body. The attack was relieved by adrenalin.

A similar attack was observed in a child of 3 years of age who received the Schick test in the Health Department office. Within 10 minutes the child suddenly developed urticaria all over the body, extreme restlessness, shortness of breath, cyanosis, coughing, vomiting, swelling of the eyelids and lips. Adrenalin was administered and repeated in the course of the next 15 minutes. The attack lasted over an hour. The history of this child is as follows: July 16, 1932, the preliminary Schick test was positive; subsequently he received two 1 c.c. injections of concentrated toxoid, the last being given August 23, 1932. Schick tests were given in September, and October, 1932, and in February, 1933, all of which were positive. The last which precipitated the attack was given August 12, 1933.

These attacks following the administration of the Schick test caused great

CHART V

TABULATION OF REACTIONS FOLLOWING ADMINISTRATION OF TOXOID

Preparations Used		New York City Health Dept. Toxoid				Michigan State Health Dept. Toxoid			
		With Alum		Without Alum		Regular		Concentrated	
Dose		½ c.c.	1 c.c.	½ c.c.	1 c.c.	½ c.c.	1 c.c.	½ c.c.	1 c.c.
Antigenic Units per Injection		4¼	8½	4¼	8½	3¾	7½	15	30
Number of Reports Received		186	129	112	113	235	101	18	78
Percent Reporting No Reactions		29	28	37	26	32	33	28	15
Percent of Local Reactions	Mild	67	67	59	65	60	63	55	61
	Moderate	6	7	3	8	3	3	17	21
	Severe								
Percent of General Reactions	Mild	27	28	15	20	15	12	28	17
	Moderate	6	6	4	3	1	8	17	18
	Severe		1		1	1		5	6

anxiety for a short time, though they left no sequelae. In the writers' experience with the immunization of 7,000 children these 2 cases stand alone, indicating their rarity. However, the possibility of their occurrence should not be disregarded. Park advances the theory that the toxoid sensitized the children to the material in the last Schick test and that the reaction might have been due to the endo-toxins in the toxoid or Schick toxin. As there is no knowledge of any child ever having died from toxoid or Schick toxin, these occurrences should not prejudice one against retesting. If others have had similar experiences, their publication might lead to a more thorough knowledge of the factors responsible.

CONCLUSION

1. After considerable experience with toxin-antitoxin and toxoid, we are of the opinion that toxoid is preferable be-

cause it produces a higher degree of immunity in a shorter time. As a result of our previous study of 1,282 children, four injections of toxin-antitoxin gave 74 per cent of Schick negative children at the end of 1 year, while two injections of toxoid with alum gave 88.8 per cent Schick negative at the end of 2 months and 94.3 per cent at the end of 1 year.

2. Toxoid of 7½ to 10 antigenic potency was preferable to the preparation of concentrated toxoid used by us.

3. Toxoid with the addition of 0.2 per cent of alum is a preferable preparation because it produces a higher degree of immunity as determined by the Schick test in a shorter time than any other used in this study.

4. It appears that three 1 c.c. injections of toxoid with alum would be ideal, yet for practical application two injections are sufficient.

5. A 1 c.c. dose produces a slightly

higher percentage of reactions than a $\frac{1}{2}$ c.c. dose but produces a higher degree of immunity.

The slightly higher frequency of local reactions from toxoid with alum should not be an objection because the reaction is mild and short. Moderate general reactions occurred in 7 per cent of cases.

6. In order to reduce the number of visits to a minimum, injection of toxoid and the Schick test at the same visit is suggested for children over 5 years of age whenever there is no history of previous immunization.

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Essentials of Typhoid Fever Control Today*

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IT cannot be expected that American health workers will take as much interest today in typhoid fever as they did a few decades ago when the disease was 10 times, or in some localities 20 times, as prevalent. In many large cities the reduction in typhoid has been amazing. In Boston, in 1888, the typhoid death rate was over 40 (40.1) per 100,000; in 1932 there was only 1 death in each 200,000 population (0.5 per 100,000). In Indianapolis the typhoid death rate was 190 per 100,000 in 1905, as against 1.6 in 1932. In the face of such figures, interest in typhoid has naturally waned. At the same time we need to remind ourselves that our relative exemption from typhoid today is purchased only through eternal vigilance.

First and foremost in typhoid control comes the safeguarding of the water supply. It was one of the earliest practical triumphs of epidemiology to show that typhoid was often due to contaminated drinking water and could be largely prevented by improving the character of the supply. There can be little doubt that the main factor in the typhoid reduction of the past few decades has been the insistence of sanitarians on pure water supplies. One of the most valuable contributions yet made by American workers to the cause

of public health is the demonstration that chlorination of public water supplies is both effective and inexpensive. But for this method of purification there would without question be much more typhoid than there is today.

I am aware that there is a tendency in some quarters to view somewhat indifferently problems of drinking water control and to consider that we have successfully completed the "engineering phase" of public health and are now ready for greater conquests. The expression "environmental sanitation" has come to have almost a derogatory significance in the minds of some, as an outworn creed. It seems to me a misconception of the basis of much of our public health work and indeed of the basis of civilization itself to look upon environmental control as something already over and done with. We stand on a thin crust. It is not enough in a complicated society to start something that looks good and then leave it to take care of itself. Unceasing, meticulous, highly skilled and conscientious attention is as necessary today as ever in preventing water-borne typhoid fever.

Wolman and Gorman have done a great service by assembling in their fine monograph the evidence of the important part still played by water in the causation of typhoid fever, particularly in the smaller communities with populations of under 5,000. In states with a large rural population this is especially evident. In South Dakota, according to

* Read at a Joint Session of the Health Officers, Laboratory and Epidemiology Sections of the American Public Health Association at the Sixty-second Annual Meeting in Indianapolis, Ind., October 10, 1933.

the water supply survey of 1930, nearly 50 per cent of the municipal water supplies were subject to pollution.

The excellent study by Bostrom, Hunter, and Towne of the epidemic in Chamberlain, S. D., early in 1933, where 247 cases were registered in a population of 1,530, shows that water-borne typhoid may still cause great disaster.

Responsibility for safe water supplies is likely to increase rather than diminish with the ever-growing load of pollution on streams and lakes. Emergencies will arise in the future, as they have arisen in the past, when the best judgment speedily applied will be needed to avoid a great catastrophe. It is always difficult to bring home to the public the fact that something has not happened which would have happened if precautions had not been taken against it. The newspaper reader rarely learns that he is being protected day by day from water-borne infection, but if an epidemic occurs and begins to die out in a natural way he is at once informed that the epidemic is "checked," or "under control," through somebody's heroic activities. Some day it is to be hoped credit will be given where credit is due, and the forgotten engineers and laboratory workers will be recognized as the real heroes whose unremitting labors keep most of us secure from the menace of water-borne typhoid. Environmental sanitation is not something to be laid on the shelf as shopworn and out-dated, but it is an ever-present fierce necessity without which our modern mastery of disease would soon prove to be an empty boast.

Most of the larger communities in the United States are well protected against water-borne typhoid at present by filtration or chlorination or both. Wolman and Gorman have shown, however, that approximately 40 per cent of the outbreaks of reported water-borne illness in the United States during the

decade 1920-1929 were caused by defects in the collection, treatment, storage, or distribution of the water, and not by pollution of a raw water at its source. The most important single factor during this period was the inadequately protected cross-connection between the public water system and a polluted auxiliary water service such as is often used for fire protection. It is plain that such cross-connections and similar potentially dangerous conditions should be eliminated wherever possible. Typhoid fever traced to a public water supply usually means that some one has been asleep at the switch.

In the smaller communities much can be done to improve the character of drinking-water supplies by a simple kind of local inspection and by education. Wells must be located with great care. The considerable distance to which bacteria may travel in ordinary soil in the direction of the ground water flow—but *not against it*—has been beautifully shown by Mrs. Elfreda L. Caldwell in experiments conducted under the guidance of Dr. F. F. Russell, Director of the International Health Division of the Rockefeller Foundation. The danger of contamination of the wells and the treacherous springs in limestone regions with their numerous underground water channels is, of course, peculiarly acute. State boards of health serving rural communities are in a position to prevent much typhoid at small expense through competent inspection of the water supplies in small towns and country districts. No longer do the large cities act as typhoid foci from which the disease spreads throughout the surrounding territory. In many localities the majority of the typhoid patients in city hospitals are not city residents but are imported from the neighboring suburban or rural population. The chief reason for this shifting of typhoid incidence from the large population groups to the small ones is

the superior urban control exercised over drinking water.

Thirty years ago raw milk was probably second only to water supply as a vehicle of typhoid infection in the United States. There is no need to dwell on this fact or on the change that has occurred. The general introduction of the process of pasteurization has all but eliminated milk-borne typhoid in the larger urban centers. To be sure, the extraordinary Montreal outbreak of 1927 is still fresh in our minds, but every one will agree that the conditions permitting that outbreak and its long continuance were in the highest degree exceptional. The value of pasteurization in preventing not only typhoid but a number of other diseases is too well recognized to need special exposition.

As regards milk supply also, the smaller communities are at a disadvantage. Properly pasteurized milk is less easily come by in small towns and villages than in cities, partly for financial reasons connected with the existence of a relatively large number of small milk supplies. It would seem probable that improvement might be effected through some form of unification, but I am aware that this is a difficult and delicate problem. It is encouraging to note that the practicability of municipal pasteurization plants for small towns is being discussed with a view to some form of organization making it possible for distributors to exchange at a central plant their raw milk for pasteurized milk each day, going on to deliver the bottled pasteurized milk to their customers. The use of federal loan funds for the construction of such small plants has been suggested.

As is well known, other raw foods besides milk may sometimes be vehicles of typhoid infection. Vegetables commonly eaten without cooking, such as celery, watercress and lettuce, have been occasionally incriminated; raw oysters,

mussels, and clams have caused typhoid in a number of instances. These sources of typhoid are susceptible of control. Great improvement in sanitary measures in the oyster industry have been made in recent years. Contamination of vegetables may be almost wholly prevented by the avoidance of the use of human excrement for fertilizing truck gardens.

A far more important aspect of food-borne typhoid infection is the contamination of food by typhoid carriers in the kitchen or on the way to the table. Some have proposed to remedy this by bacterial examination of all food handlers in dairies, bakeries, lunch counters, hotels, restaurants, and boarding houses. Apart from the colossal amount of labor and expense involved in routine examination of numbers running into the tens of thousands in our larger cities and including a rapidly changing personnel, there are certain technical difficulties that make such examination of doubtful practical value. Chief is the well known *intermittency* of discharge of typhoid bacilli so that a single failure to find typhoid bacilli in the stools of a food handler, and even several consecutive negative results, give no guarantee of safety. Cultures from the bile sometimes give positive results when stool cultures have been negative. In some instances carriers who have been proved to transmit infection, discharge typhoid bacilli only at long intervals over a term of years.¹

Detection of carriers by bacterial examination has thus far been most valuable in connection with specifically identified sources. There is abundant evidence that in communities where water-borne and milk-borne infection have been practically eliminated, it is carrier infection that keeps the disease alive. Milk-borne infection itself is mainly a problem of carriers. An instance is on record where one and the same carrier apparently gave rise to

typhoid in three different ways, by milk, by contact, and by water contamination.²

The effective control of known typhoid carriers is well recognized as a vexatious problem in public health administration. It is a serious matter to take away a family's means for livelihood, or to cause an individual to be looked upon as an outcast by neighbors and friends. Too great severity in supervision may lead simply to shifting the carrier's field of operations. On the other hand, there are unquestionably some cases where indefinite detention of a carrier in a hospital is necessary to protect the public health; this is recognized in the recent revision of the Sanitary Code of the City of New York.

Attempts to cure typhoid carriers by non-surgical means, such as chemotherapy, vaccine therapy, or bacteriophage, have not been generally successful and number few advocates at the present time. Surgical treatment, especially removal of the gall-bladder, has much to recommend it. In a series of 12 cases recently reported by Bigelow and Anderson,³ removal of the gall-bladder was apparently followed by complete cure of the carrier condition. In another series studied in New York State removal of the gall-bladder re-

sulted in the apparent cure of the carrier condition in 59 per cent of those from whom required specimens had been submitted. There were no fatalities in 35 carriers who were under 50 years of age at the time of operation, but the mortality in those over 50 was 32.3 per cent.⁴ Browning and his coworkers in England⁵ have also reached the conclusion that removal of the gall-bladder yields highly satisfactory results. The risks of operation for persons of suitable age and physical condition seem to be justified since chronic infections of the gall-bladder are likely sooner or later to affect seriously the health of the carriers. From the standpoint of efficiency and administrative economy this method of dealing with carriers is probably superior to any other.

While the number of registered carriers is a relatively small proportion of the total—in Massachusetts 75 known carriers out of a calculated 1,100 in the state—there is no reason to assume that the undiscovered carriers are equal sources of danger. Some of them undoubtedly never give rise to a single case of typhoid.

It must be remembered also that the carrier problem is in a sense solving itself, that all preventive measures

TABLE I
AGE GROUPS OF TYPHOID CARRIERS

Age Group	Germany * (220 carriers) per cent 1906-1907	New York † (368 carriers) per cent 1911-1932	Upstate New York (33 carriers) Numbers 1931
Under 10	2.7	0.3	0
10-19	4.1	2.6	1
20-29	13.1	6.2	1
30-39	24.1	14.7	4
40-49	23.2	19.0	4
50-59	15.5	23.0	9
60-69	10.9	23.0	10
70-79	2.7	8.2	3
80+	0.9	1.9	1
Unknown	1.8	1.1	

* Klinger, *Arch. n. d. k. Ges.*, 30:584, 1907.

† Seiftner and Coughlin, *Am. J. Hyg.*, 17:712, 1933.

automatically reduce the number of carriers. Any decrease in typhoid is cumulatively as well as immediately beneficial. The typhoid carrier is passing off the stage.

Available figures give some evidence of this. I have tabulated (Table I) the age distribution of 220 carriers studied in the first decade of this century during the campaign against typhoid in the southwest of Germany together with that of 368 carriers discovered in New York State (not including New York City) between 1911 and July 1, 1932, nearly all of them in the last 10 years. This comparison (Table I) shows that in 1906-1907 there were many more carriers under 50 years of age than over, while in recent years the reverse is true.

Closely connected with carrier infection is the possibility of infection directly or indirectly from typhoid patients. Although this danger is well known, and nurses and physicians are as a rule measurably protected by vaccination, there is evidence that infection—what used to be called “contact infection”—from this source should be carefully guarded against. Such infection may be easily carried outside the family. In April, 1933, 11 cases with 2 deaths were caused among those attending a church supper in an Illinois town through food contaminated by a mother who had been nursing her son, ill with supposed “intestinal flu,” later diagnosed as typhoid. There is no doubt that medical students in large urban centers no longer have a chance to become thoroughly familiar with clinical typhoid and that occasional mistaken diagnoses are not unlikely. Suspected typhoid, as well as diagnosed typhoid, should be at once reported to health authorities.

The responsibility of hospital management in typhoid fever cases is a grave one. So far as I am aware there are no data that indicate how far this responsibility is met, but it must be

borne in mind that, as Garbat⁶ has shown, the usual routine stool examinations during convalescence may miss 15 per cent of all typhoid carriers, and that 25 per cent of the temporary carriers alone may be dangerous for as long as from 1 to 2 months after defervescence. The infective status of the typhoid patient on his release from the hospital is, therefore, a matter of serious concern to health officials.

Improper disposal of excretal refuse has almost disappeared as an urban problem, and is less urgent than it used to be in country districts as a result of the campaign for sanitary privies. The importance of guarding against transmission of infection by house flies or vermin having access to imperfectly constructed privies has received wide publicity. In certain sections of the country, however, much still remains to be accomplished. The remarkable success that has attended the installation of proper sanitation throughout the island of Jamaica under unusually difficult climatic and economic conditions may well spur us to new efforts in this field.

Prophylactic inoculation against typhoid, as all the world knows, has been brilliantly successful in preventing extensive infection among soldiers and others specially exposed. Its use should be mandatory in asylums and all custodial institutions. All persons exposed by their mode of life, such as physicians, nurses, medical students, laboratory workers, laborers in lumber or construction camps, and travelers in typhoid-ridden countries, should be inoculated against typhoid as a routine practice. Although the protection so conferred is by no means absolute and is known to have been broken down in a number of instances, probably by massive doses of infection, the evidence from comparative statistics is overwhelmingly favorable.

With regard to widespread inocula-

tion of civilian populations, we need more evidence as to the types of vaccines used, and especially do we need full and adequately controlled records before we are in a position to determine the relative value of this procedure as compared with that of more fundamental measures. The recent work of Grinnell⁷ on the relative ineffectiveness of the Rawlings typhoid strain as an immunizing agent has been confirmed by Perry and his associates⁸ who found that 10 unvaccinated mice all died with the test dose of a virulent typhoid strain, and that 28 died out of 30 mice vaccinated with three different vaccines prepared from the Rawlings strain, whereas only 3 died out of 27 mice that had been vaccinated similarly with a demonstrated smooth strain recently isolated. While caution of course is necessary in applying the results of such experiments to man, there is abundant reason for knowing definitely about the character of the vaccine before embarking upon vaccination "campaigns." Conceivably there are conditions where general civilian vaccination may be hopefully undertaken, but we need more evidence as to its real value. Unless control is exercised in a given area over water supply, excreta disposal, and other well known factors, the results from wholesale

vaccination may be disappointing. If these basic sanitary measures are properly carried out, general vaccination may be unnecessary. It is better to put the house in order than to wallow in dirt and then take medicines to ward off the effect of slovenly living.

The general strategy of combating typhoid fever at the present time seems clear. It consists essentially in putting into practice the knowledge we already possess. First, tighten and strengthen the barriers that prevent typhoid bacilli from getting into drinking water or into milk and other foods. Second, in those communities where typhoid has already been reduced to a low point by the application of such measures, investigate the source of each case and minor outbreak and concentrate on the elimination of case infection, and especially carrier infection, knowing that time itself is fighting on our side.

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What Are the Essentials of Typhoid Fever Control Today?*

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THE question "What are the essentials of typhoid fever control today?" carries with it the implication that these essentials are no longer the same as formerly. Although our fundamental conceptions as to the cause and mode of transmission of typhoid fever remain the same, the problem of control is materially different from that of a generation or even a decade ago because of the changes which have taken place in the prevalence of the disease. Since these changes have a direct relationship to prevention, they will be discussed briefly before reviewing the present status of typhoid control.

TYPHOID PREVALENCE

The trend of typhoid mortality during the past 20 years in 11 states, 6 of them in the northern, and 5 in the southern part of the country, is shown in Table I and in the accompanying graph. The northern states are Connecticut, New Hampshire, Maine, Michigan, Minnesota, and Wisconsin, and the southern states include Kentucky, Maryland, North Carolina, Tennessee, and Virginia.* Populations and deaths for places of less than 10,000 population in North Carolina in 1913, and for the State of Tennessee from 1913 to 1916 inclusive, are not

included because data for these areas in the years specified are lacking.

The typhoid death rate in the 11 states fell from 21.9 in 1913, to 4.2 in 1932, a decline of 81 per cent. Similar decreases have been observed throughout the United States and Canada (Howard 1932, *Mon. Epi. Rept. League of Nations, 1933*), and although the term "residual typhoid fever" was in common use 20 years ago, there is little indication that death rates in most states and provinces have ceased to decline or have yet approached stationary levels.

That the downward trend of typhoid mortality has been general, and not limited to any one section of the country or population group, is demonstrated by Table II. In this table are given urban and rural typhoid death rates by 5-year periods from 1913 to 1932 inclusive among the white populations of the 5 southern states, and among the total populations of the 6 northern states previously mentioned. Rates among the white populations of southern states are compared with rates among the total populations of northern states because of the low proportion of negroes

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* According to the 1930 Census, the 6 northern states had a combined population of 13,214,903 persons, and the 5 southern states a combined population of 12,454,798 persons. The density of population for northern states was 56 persons per sq. mi. and that for southern states 69 persons per sq. mi. Fifty-nine per cent of the population of northern states, and 34 per cent of the population of southern states lived in places with 2,500 or more inhabitants in 1930.

TABLE I
TYPHOID FEVER DEATH RATES IN 11 STATES, 1913 TO 1932, INCLUSIVE *

Year	Population	Number of deaths	Death rate per 100,000
1913	16,087,910	3,529	21.9
1914	18,510,750	3,706	20.0
1915	18,784,056	3,159	16.8
1916	19,057,362	3,208	16.8
1917	21,629,131	4,008	18.5
1918	21,918,207	3,222	14.7
1919	22,197,286	2,820	12.7
1920	22,513,653	2,192	9.7
1921	22,837,352	2,681	11.7
1922	23,161,049	2,066	8.9
1923	23,484,746	2,019	8.6
1924	23,808,443	1,888	7.9
1925	24,132,142	2,388	9.9
1926	24,455,838	2,019	8.3
1927	24,779,537	1,696	6.8
1928	25,103,233	1,360	5.4
1929	25,426,932	1,170	4.6
1930	25,750,626	1,343	5.2
1931	26,074,322	1,262	4.8
1932	26,398,018	1,115	4.2

* States included: Connecticut, Kentucky, Maine, Maryland, Michigan, Minnesota, New Hampshire, Virginia, Wisconsin 1913-1932; North Carolina 1914-1932; Tennessee 1917-1932.

in the North. The terms "urban" and "rural" are here used as in *U. S. Mortality Statistics* where places with less than 10,000 population are classified as rural.

Table II shows marked decreases in the urban and rural sections of both northern and southern states. These decreases have been more extensive, and the final rates are considerably lower in the North than in the South. However, although lagging behind northern ratios, the rates in southern states are more than two-thirds lower than they were, the white urban rate in the South having declined 77 per cent, and the rural rate 68 per cent during the 20-year period.

Moreover, typhoid fever mortality has decreased to a remarkable extent even in the smallest and most scattered population groups. Thus, the mean annual typhoid death rate (based on

deaths allocated to place of residence) for New York State unincorporated territory from 1913 to 1917 inclusive was 8.0, and the corresponding rate for the same population group from 1928 to 1932 inclusive was 1.5 per 100,000. This decline of 81 per cent is noteworthy since it occurred for the most part in strictly rural districts without public water supplies, and in New York, a state where only a negligible proportion of the population have received typhoid vaccine.

According to a compilation of communicable disease cases made by the U. S. Public Health Service for the White House Conference (1931), the trend of typhoid morbidity has been the same as that of mortality. Taking both morbidity and mortality data into consideration, it appears that, by and large, typhoid fever has decreased in prevalence more than any other common

acute communicable disease with the possible exception of diphtheria. The extent and continuance of this decline have been stressed for two reasons, one of which is to point out that due caution must be exercised in evaluating the results of preventive measures by means of reductions in morbidity and mortality rates. Typhoid case and death rates are falling so rapidly that reductions in a given area cannot be interpreted as directly resulting from any single preventive measure, unless they are significantly greater than those in similar localities where the same measure has not been employed.

A more important reason for emphasizing changes in typhoid prevalence is to make it clear that control of the disease is no longer the object to be attained. Provided decreases can be made

to continue at their present satisfactory rate, the complete eradication of typhoid fever is an actual possibility, and is the goal toward which future preventive efforts should be directed.

ENVIRONMENTAL PREVENTIVE MEASURES

That our present favorable typhoid situation has been arrived at largely because improvements in water, and milk supplies, sewage disposal facilities, and other environmental conditions is seldom, if ever, seriously questioned. Certain recent studies afford confirmatory evidence of the association between environmental factors and typhoid prevalence, and serve to demonstrate that the possibilities for further reductions by means of sanitary improvements have not yet been exhausted.

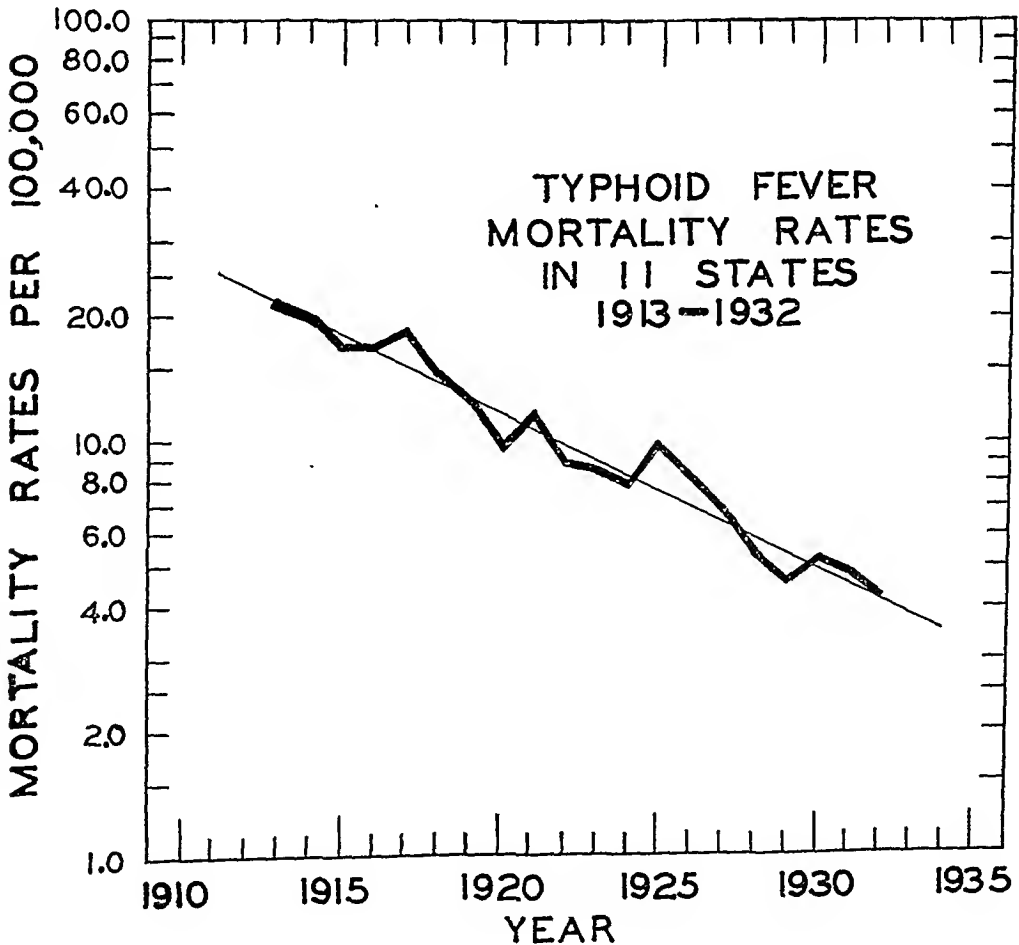


TABLE II

MEAN ANNUAL URBAN AND RURAL TYPHOID FEVER DEATH RATES PER 100,000 IN 6 NORTHERN STATES, AND AMONG THE WHITE POPULATIONS OF 5 SOUTHERN STATES, BY 5-YEAR PERIODS, 1913-1932 INCLUSIVE *

DEATH RATES PER 100,000

Period	Urban		Rural	
	Southern white	Northern	Southern white	Northern
1913-1917	20.8	12.8	27.8	7.5
1918-1922	10.6	5.7	17.6	4.4
1923-1927	6.8	3.0	14.0	2.2
1928-1932	4.7	1.2	8.8	1.3
Per cent decrease	77	91	68	83

* Data 1913-1929 inclusive from U.S. Mortality Statistics
Data 1930-1932 obtained from States by correspondence

Veldee (1931) found that in 6 Ohio river cities typhoid death rates were somewhat reduced by changes from raw water to partially treated supplies, but were not brought down to rates comparable with those in a control group of cities until the water supplies received entirely adequate treatment. It is probable that reductions of the same sort have followed successive water supply improvements in cities generally, these reductions being less striking than those in earlier years, and therefore less commented upon. A large number of New York State water supplies have been improved during the past two decades, particularly in villages and cities of from 2,500 to 25,000 population, the majority of larger cities having had good or fairly good supplies prior to 1913. From 1913 to 1922 inclusive, 24 water-borne epidemics are known to have occurred in the 138 places belonging to the 2,500 to 25,000 population group, whereas during the period 1923 to 1932 inclusive, there were only 6 water-borne outbreaks in places of the

same size, no such outbreaks having occurred since 1928. In 1,301 communities with less than 2,500 inhabitants, and with proportionately fewer water supply improvements, there were 14 water-borne outbreaks from 1913 to 1922, and 10 water-borne outbreaks from 1923 to 1932 inclusive.

Doull, Morales, and Haygood (1928) found that in Knoxville, Tenn., typhoid fever was most prevalent among persons who, though living inside the city limits, used privies or outdoor flush closets, and drank water from wells and springs. It is believed that if this survey were repeated in other cities with high typhoid death rates, similar results would be obtained, and that in spite of accessible city water supplies and sewerage systems, large numbers of people drinking spring or well water and using privies would be found.

After an intensive study of recent epidemics, Wolman (1931) gave warning that water-borne typhoid fever is still a menace, and emphasized the necessity for continued efforts to improve the

quality and supervision of water supplies. The same statement should be made with respect to milk supplies, sewage disposal facilities, and other environmental conditions. Environmental preventive measures are still major essentials of typhoid control, and it is certain that these measures have not yet been used to the fullest possible extent, especially in areas where the prevalence of the disease remains strikingly high.

TYPHOID CARRIERS

With the gradual elimination of opportunities for the wide dissemination of the disease by means of polluted water and milk supplies, and other defective environmental factors, typhoid carriers have come into greater and greater prominence, and as sources of infection now occupy, or should occupy, an important place in control programs. The vast majority of carriers are discovered either during investigations of typhoid cases and outbreaks, or as the result of requiring release specimens of feces from convalescent patients.

As regards the discovery of carriers by means of epidemiological investigation, it is clear that success depends upon careful, intelligent case study by qualified personnel. Unfortunately, the ideal of tracing the majority of sporadic cases, and small endemic typhoid foci to carrier infection is scarcely ever realized even in states with the fewest cases and best investigative facilities. Reasons for failure include superficial inquiry as to the circumstances surrounding the case, lack of sufficient numbers of fecal specimens from contacts and suspected carriers, and in some instances poor laboratory examination of the specimens obtained.

As would be expected, more carriers have been discovered in New York State by means of epidemiological investigation in small communities than in large cities. Two-thirds, or 194 of

the 288 carriers so discovered in the state, outside of New York City and state institutions, up to the end of 1932 were found in villages of less than 2,500 population or in unincorporated territory.

Excluding all those in known epidemics, 1,354 typhoid cases were reported in New York State places with more than 2,500 population outside of New York City and state institutions from 1928 to 1932, inclusive. During the same period, 1,325 non-epidemic cases were reported in places of less than 2,500 population and unincorporated territory. Thirty-five carriers were discovered from 1928 to 1932 inclusive, in the investigation of non-epidemic cases in places of more than 2,500 population, and 65 carriers were discovered in places of less than 2,500 population and unincorporated territory by means of the investigation of cases not occurring in outbreaks. Thus, a carrier was discovered for every 20 sporadic cases in places of less than 2,500 population and unincorporated territory, whereas the ratio of non-epidemic cases to carriers epidemiologically discovered in places with more than 2,500 population was 39 to 1.

Since this control measure has been used in New York State, 88 typhoid carriers have been added to the register as a result of making the release of convalescent patients conditional upon the submission of negative fecal specimens. Records have been kept since January 1, 1930, showing the number of fecal specimens obtained from each case, and the results of each examination. Between January 1, 1930, and September 1, 1932, complete records for 1,599 cases were obtained. Of this group of patients, 191 died, and 43 absconded or left the state. Two or more fecal specimens were obtained at intervals of at least 5 days and 3 weeks or more after date of onset from all but 47 of the remaining patients. Thirty-three,

or 2.5 per cent, of these 1,318 individuals remained positive for typhoid bacilli and have been, or will be declared carriers, this proportion being almost identical with that for Massachusetts reported by Bigelow and Anderson (1933).

Methods for supervising typhoid carriers, and the results of gall bladder operations for their cure have recently been described by Senftner and Coughlin (1933), and Bigelow and Anderson (1933). A few states and cities already have well developed facilities for handling the typhoid carrier problem; but looking toward the eradication of the disease there is great need for the extension of this service in all parts of the country. Granting that the administrative machinery for these purposes is of necessity cumbersome, the discovery and supervision of carriers are essential preventive measures, not to be neglected because of the difficulties incident to carrying them out.

INDIVIDUAL CASES AND CONTACTS

At the present time, some communities go through an entire year without a single typhoid case and, excluding epidemics, there are few cities and counties in which more than 75 or 100 cases are reported annually. Typhoid fever now belongs to the group of uncommon diseases, demanding confirmation of diagnosis, and active health department participation in the management of each individual case.

The dearth of typhoid cases in teaching hospitals has been mentioned on various occasions, and since clinicians in practice see cases rather seldom, other febrile conditions, notably tuberculosis and undulant fever, are not infrequently erroneously diagnosed typhoid fever. Of the 3,561 typhoid and paratyphoid cases reported in New York State, outside of New York City, from 1928 to 1932 inclusive, 114 were

later removed from the register because of wrong diagnosis. This number takes into account only cases in which the clinician went so far as to commit himself definitely to the local health officer, there having been an unknown but probably considerable number of instances where the diagnosis was changed before a report card had been filled out.

The advantages to the typhoid patient of hospital care have long been realized. Certain data are now available suggesting that the hospitalization of cases is also of value as a means for preventing the occurrence of subsequent cases among household contacts.

According to New York State records for the years 1930 to 1932 inclusive, in families where the primary case was hospitalized, 85 subsequent typhoid cases occurred among the 1,221 household contacts who had not been immunized or had typhoid fever previously, the subsequent attack rate being 7.0 per cent. Of 1,035 contacts of similar status with respect to previous attacks and immunization, but who lived where the primary case remained at home, 110, or 10.6 per cent, were attacked. Thus, the incidence of subsequent cases was more than a third lower when the primary case was hospitalized than would have been expected if this patient had remained at home.

Further, considering individual patients and members of the same families, it is possible to show indirectly that the incidence of secondary cases is related to the environmental status of the household. Subsequent attack rates among familial contacts of typhoid patients in places of 10,000 and over, and in places of less than 10,000 population in New York State, exclusive of New York City, are presented in Table III, the incidence of secondary cases being shown for two periods, namely, during the first 14 days after the onset of the primary case, and 15 or more days after this. In the preparation of this table,

all cases and contacts in known epidemics have been omitted; cases and contacts in families where a known carrier existed prior to the date of onset of the initial case have also been omitted; contacts giving histories of typhoid vaccination or previous attacks of typhoid fever have been left out.

The subsequent attack rates in both periods were significantly higher in places with less than 10,000 population, than in places with more than 10,000 inhabitants. Some of the cases during the first 14 days may not have been secondary, but may have arisen from the same source as the primary case. However, few original sources would be expected 15 or more days after the primary case, so that most of the cases in the latter period were probably contracted as the result of familial exposure.

Household contacts in communities of 10,000 or more population were apparently exposed to less risk than contacts in smaller communities. This finding may be interpreted as being due to the fact that houses in places of

10,000 or more population are generally equipped with running water and indoor flush closets, conditions under which the observance of case prophylaxis would be much easier than in homes without such conveniences.

TYPHOID VACCINATION

Of the preventive measures which have been widely used, vaccination remains to be considered. There is no doubt as to the efficacy of this procedure as a method for protecting contacts and individuals apt to be unduly exposed by reason of occupation or travel, and its usefulness as an emergency measure in civil population groups has likewise been proved. For example, Mustard (1930) reported the occurrence in Rutherford Co., Tenn., of 29 secondary typhoid cases among 695 non-immunized household contacts, but observed no secondary cases among 776 household contacts who had been immunized 1 month or more prior to exposure.

Although of demonstrable worth under special and emergency conditions,

TABLE III

SUBSEQUENT ATTACK RATES FROM TYPHOID FEVER AMONG CONTACTS IN FAMILIES WHERE THE PRIMARY CASE REMAINED AT HOME, ACCORDING TO LOCALITY AND DATE OF ONSET OF PRIMARY CASE, NEW YORK STATE, 1930-1932, INCLUSIVE *

Size of Locality	Days after onset of primary case				Subsequent attack rates per cent	
	1-14		15 and over		Days after onset of primary case	
	Number exposed	Number of subsequent cases	Number exposed	Number of subsequent cases	1-14	15 and over
10,000 and over	290	8	282	4	2.8	1.4
Under 10,000 and unincorporated territory	557	41	516	29	7.4	5.6
Total	847	49	798	33	5.8	4.1

* Exclusive of New York City and State Institutions, and exclusive of cases and contacts in known epidemics; contacts with histories of vaccination and previous attacks; cases and contacts in families with known carriers.

there are valid objections to the vaccination of civil population groups as a permanent, or semi-permanent control measure. In the first place, the argument used in advocating smallpox and diphtheria immunization as permanent measures to the effect that infection may be acquired from hidden sources even when there are no known cases in the community does not hold in typhoid fever. Unlike the other two diseases, sources of infection in typhoid fever are more or less stationary in character, and of such a nature they can eventually be eliminated.

The highest typhoid death rate observed during the period 1928 to 1932 inclusive, in any population group in the 11 states previously mentioned, was that for negroes in the rural sections of southern states, among whom deaths occurred at a rate of 13.4 per 100,000. At this expectancy, it would be necessary to immunize 7,400 people to prevent a single death, and about 740 people to prevent a single typhoid case. Taking into consideration the brief duration of the protection conferred by typhoid vaccine, the wisdom of spending time and money on a procedure which gives promise of such meager results may well be questioned.

SUMMARY

Typhoid fever has decreased in prevalence to a remarkable extent in all sections of the country, even during very recent years. Because of the low levels already reached, and since typhoid case and death rates are continuing to fall rapidly, eradication of the disease rather than control is the goal toward which future efforts should be directed.

Examining various preventive measures with the possibility of typhoid eradication in

mind, it has been concluded that measures for the improvement of environmental sanitation are of major importance, and that these measures have not yet been used to the fullest possible extent.

Among the preventive measures which have come into greater prominence with the decline of the disease are procedures for the discovery and supervision of typhoid carriers. There is great need throughout all sections of this country and Canada for more intensive case investigation, and for the development of facilities for the supervision of carriers.

Typhoid fever now belongs to the group of rather uncommon diseases in which the diagnosis must be confirmed and the health officer must participate in the management of individual cases. It appears that other members of the household are less apt to contract typhoid fever when the primary case is removed to a hospital, and that when the patient remains at home fewer secondary cases occur in large than in small communities.

Under special and emergency conditions, typhoid vaccination is a useful and necessary procedure, but its employment as a permanent control measure in civil population groups is of doubtful value.

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Modern Trends in Public Health Administration in Cities*

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PRESENT trends in public health administration, in cities, are essentially the same as are those in counties and states. This is what one might expect, since some of the more important reasons for certain trends are the same throughout the country. I shall not attempt to mention changes that are occurring in many cities due primarily to the many various local conditions, but shall limit my discussion mostly to changes or trends that are more or less common to all cities.

It is generally acknowledged that business concerns should periodically take an inventory of their stock in order to plan intelligently for the future. During normal or prosperous times, it may be safe to drift along without worrying very much about one's present position or future destination, but during the storms of an economic depression, it behooves everyone to keep his eye on the compass and his hand on the helm.

What is true of business is also true of public health work. The time has arrived when even health officers must stop and ask: "Where are we heading?" The days of fairly adequate appropriations and sympathetic support for public health work are only pleasant memories in most communities. Many of the public health activities have been put in the class of nonessential public

services in many cities, instead of being considered at least as vital to the welfare of a city as are fire and police protection and education. Reducing health department budgets even during normal times is a serious matter, but reducing them during years of poverty and distress, when both the need and the demand for public health services are tremendously increased, is something that even the most pessimistic health officer did not expect. The demand of tax payers for more and better public health service at a lower cost, has forced health officers to make many changes, regardless of the merits of such changes.

In considering, therefore, modern trends in public health administration, it must be remembered that many of such trends are apt to be only temporary, because they are due more to restricted budgets than to intelligent and efficient planning. There are some, however, that are not related to the present economic depression, and for that reason may be considered both permanent and desirable.

According to reports, which 20 city health officers were good enough to give me, some of the present trends in public health practice are as follows:

First, a more efficient and conscientious appraisal of all health activities and the elimination of the less essential services. One health officer expresses this trend as follows:

The keynote of administration is to fight to the last ditch for the retention of essential

* Read before the Health Officers Section of the American Public Health Association at the Sixty-second Annual Meeting in Indianapolis, Ind., October 9, 1933.

health services, and to permit the less essential things and all the frills to go by the board.

There appears to be no agreement as to what the less essential or so-called frills are. Most cities have reduced their appropriations for health bulletins, annual reports, and other health publications, but one health officer writes:

It is very unfortunate that a great number of health departments have ceased to publish their bulletins and have curtailed their annual reports. This so-called depression has brought about economy which spells ruin for the proper steady development of health departments.

Fortunately, the inexpensive practice by health officers of making more use of the daily newspapers, the platform, and radio will at least to some extent make the curtailment of health department publications less serious.

Many cities have curtailed their school hygiene programs, by materially reducing the number of physical examinations of school children, but no one will contend that such examinations, even when hurriedly made, can be put in the class with frills. While it is true that some health services may appear nonessential when compared with other very vital health activities, nevertheless, when compared with road construction and reforestation programs, the development of public parks and playgrounds, the construction of water power and irrigation projects, and many other expensive public undertakings, they not only appear very valuable, but also ridiculously inexpensive. On the whole, health departments have had to fight too hard for increased appropriations, even during prosperous times, for them to have been even tempted to develop so-called frills. Almost every public health activity is considered unnecessary by the large tax payers who have all at once discovered that it is cheaper for them to purchase their preventive treatment from the private physician, than to be taxed for a community health pro-

gram. Let us, therefore, be very careful in appraising our present health services, and not be influenced too much by selfish interests.

The second trend that seems to permeate nearly all city health departments is toward coördination and consolidation. Various divisions within health departments are being merged into larger units. It is becoming more common to consolidate the divisions of contagious disease, tuberculosis, and venereal disease into one bureau or department.

The trend from specialized public health nursing to generalized nursing is slowly continuing.

Better team work is being developed between public health departments and private health and social agencies.

Cities are depending more on general hospitals for the hospitalization of contagious disease cases.

The tendency to transfer services related to public health, but not necessarily requiring health department supervision, to other city departments, is on the increase. It is being realized more and more that activities related to public hygiene and sanitation can be supervised more economically and much more efficiently by the police, fire, public works, and housing departments, than by a few sanitary inspectors.

In many cities health departments have been compelled to assume responsibility for the treatment of the indigent sick. The demand for free medical care has become so great that it can no longer be met by the medical profession and small private dispensaries.

At least one health department is also offering free diagnostic service to private physicians for patients unable to pay the fees of specialists. There is a great need for this type of service and unless the medical profession offers better diagnostic service to the middle class people, the trend toward a public diagnostic service will grow.

Although the demand for economy has forced many mergers in health departments and communities, yet few, if any, mergers of several communities have occurred. Politicians still prefer expensive and inadequate public service to the danger of losing their jobs through the consolidation of several governmental units.

As a third trend, I might mention the increasing practice of health departments to center their attack on younger age groups. Diphtheria immunization work is gradually being limited to infants and preschool children.

In tuberculosis work health departments are no longer waiting for people, with a history or signs and symptoms of tuberculosis, to report to their chest clinics for an early diagnosis, but are developing intensive tuberculosis detection programs in schools. The tuberculin test and X-ray are no longer limited to a few children suspected of tuberculosis, but are made available in many cities to all children in the upper grades and high schools.

The last, and undoubtedly the most important trend in public health administrative practice, is the turning over to the medical profession of many old established health services. Most of these were established in health departments years ago by physicians in private practice. At that time it was felt by members of the medical profession that a preventive health program could only be successfully developed and operated by a public health agency.

For years, health departments with the coöperation of private physicians have gradually enlarged and improved their health activities. Very few physicians questioned either the authority or ability of health departments to conduct child welfare, tuberculosis, venereal disease, and immunization clinics, until recently.

Not only are private physicians demanding a greater opportunity to participate in preventive health work, but nearly all health officers are willing to turn over at least some of their work to private physicians. Whether this is only a temporary trend due to the economic depression, or a permanent change, is not easy to determine. I feel certain, however, that unless this change in public health practice is made in an orderly, unselfish, and intelligent manner, there is great danger that everyone concerned will sooner or later suffer from an inadequate and impractical public health program.

The following excerpts taken from letters of health officers, give perhaps a fair picture of the attitude prevailing among health officers on this problem:

1. The private physician should be given a more recognized place in the health of the community.

2. Find some means to overcome the antagonism of private physicians to the preventive work we are trying to do.

3. My views with respect to present trend generally in cities in public health work, are that while many of the activities undertaken by government agencies in various cities probably accomplish a good purpose and meet the approval of the citizens generally, I am wondering on the other hand, if many of these activities do not legitimately belong to the private physician, and should they not be given proper consideration.

4. I realize that in some of the larger centers, the medical profession has interested itself considerably in the advancement of public health work. I cannot believe that this will become permanent, or that it will assume the responsibility of carrying on public health work. A few of them, undoubtedly, would show sufficient interest and take the responsibility, but not the rank and file.

5. After many years of public health work, I still feel that the sum of the efforts of the individual physicians is the greatest asset in the whole game of public health. Any health officer who has not the full confidence of the medical profession is a failure and his work is a failure.

6. I should like to feel that the trend is toward preventive medicine among both the medical profession and the laity, but I am

afraid this would be limited to a comparatively small group.

7. We are continually dodging thrusts from various organizations, even sometimes from our own profession, and we have got to work out some problems of our own organization in order to make ourselves secure.

8. Now as to tendencies for the future no one can prognosticate with certainty. My own impression, formed from personal observation of what is going on around me, and from reading about what is transpiring in other provinces of the Dominion as well as in the United States, is that we are gradually coming to State Medicine, whether we like *the prospect or the reverse*. Legislation in the Western Provinces providing for the appointment of government paid district physicians and the increasing army of private physicians, earning barely a decent subsistence, that in increasing numbers are openly advocating State Medicine as a solution for present difficulties, would indicate a trend in its favor on the part of both the profession and the laity.

The adoption by states and provinces of the responsibility for providing an adequate medical service for the vast population comprising what might be called the near indigent, presupposes changes and adjustments in our public health services, local, state, and federal, which it would be entirely impossible to predict. Moreover, in my opinion, it can be reasonably contended that hospital administration in many of its aspects is and should be intimately related to the public health program of the community, and the same is true in regard to the administration of poor relief.

Briefly expressed, it is my firm opinion that we are approaching a new era—a new conception of values in the field of preventive medicine—and that if we are to justify our work in the future new relationships and adjustments in the fields of prevention, therapeutics, social service, hospital administration, voluntary assistance, etc. will eventually be adopted.

We see from these excerpts that even health officers do not agree among themselves as to certain trends and their merits. It appears that the time has arrived when a public health program should be developed to which not only all health officers can conscientiously subscribe, but which will also be approved by the medical profession.

Representatives of the American Pub-

lic Health Association ought to meet the representatives of the American Medical Association, to see if it is not possible to standardize a public health program, satisfactory to both organizations, without in any way jeopardizing the health and welfare of the public.

While someone has said that variety is the spice of life, we do not want to make radical changes in public health practice merely to be changing. During economic depressions when people are compelled to give up many things which they have previously enjoyed, we find irresistible demands for all kinds of changes. Many of the demands are spontaneous, justifiable, and for the benefit of society, while others are forced by a selfish minority, are unreasonable, and are very apt to be detrimental to a majority of the people.

The philosophy that when things are very bad they cannot be made worse by any kind of a change, has been responsible for much grief and regret in the past, and should therefore be applied very cautiously in the future. It may be safe to change our local, state, or national administration during a period of economic depression and unrest; it may even be safe to change our constitution and long established governmental policies; in fact, it is not only safe to make changes in our political, economic, financial, and social life, but such changes are absolutely necessary, if civilization is to continue. The changes we must guard against are those that would have us give up something that has proved its value over a period of years, for something that is still in the experimental stage. Public health work, as practised during the last two decades, has stood the severe test of a 4-year economic depression, which should make all of us hesitate to accept radical changes without conscientious, fearless, and intelligent consideration.

The Depression and Its Effect on the Mental Health of the Child*

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THERE is probably no other single factor, unless it be the innate constitutional make-up of the child, which is so important in determining personality traits and life attitudes as the familial relationships in which the individual finds himself. The significance of such relationships is not to be understood primarily in terms of blood relationship or kinship but must be found in the personal interactions of the different members comprising the family. It quite naturally follows, therefore, that in any discussion of the depression in relation to mental health of the child we cannot ignore the effect of the depression on all the members of the family and, by extension of these effects since no family lives solely unto itself, on all others with whom the child comes into close contact such as teachers and playmates.

It is unfortunately true that the effects cannot be measured statistically in a satisfactory manner. In fact, what follows in this paper is pretty much the impressions of the writer drawn chiefly from his rather intimate contact with social agencies and as the direct result of his work in the Cleveland Child Guidance Clinic. Quotations from the writings of others will

be cited only to substantiate the writer's own impression.

Let us cite what in the records of family and relief agencies is a very common story. Every psychiatrist in child guidance work is all too familiar with it. It will serve as a bird's-eye sketch of what is to follow.

In the early days of the depression Mr. A., a sub-executive, like many other Americans in high and low places, did not take the situation so seriously. The attitude then expressed was that it could not last long, good times were just around the corner. As the months wore on and spring came without bringing improvement this seeming indifference was put aside. Husband and wife were plainly worried. The man was tramping the streets from morning till night but without success—a job could not be found. Mrs. A., however, could not understand the situation. She felt the husband was not really looking for work. Then began the family quarreling. The children quite naturally took sides—the boys were apt to side with mother, the girls, always close to their father, thought mother unfair to him.

Retrenchment had been made all winter. By spring, the savings were well-nigh exhausted. Standards of living were being lowered. It became necessary to give up their home and move into cheaper quarters in another

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section of the city. The children were transferred from private school to public school. Their little world came toppling down about them and there was nobody to help interpret it to them. For them it spelled disaster. Their lives had been lived on another level. The question is not whether that was the proper level but rather that on that level they had been reared. They lost their sense of security, their foothold.

As time went on, savings were exhausted and the family had to turn to the relief agency and to exist on its meager allowance. Self respect was dragged into the mud. Always accustomed to paying rent, they now found themselves in no position to do so. Gas, electricity, telephone, all those things that tend to make living comfortable, had to be done without. Kerosene lamps, small oil burners, or cheap coal stoves now became the sources of light and heat.

The children who were formerly well dressed now had to be thankful for the cast-off clothing of others. Is it any wonder that many of them rebelled and became disagreeable, disobedient, and ugly toward their parents, or developed symptoms of so-called nervousness as expressed in fears, super-sensitiveness, physical complaints without organic basis, or in anti-social activity such as stealing and truancy?

In the homes of the poor, always on the ragged edge, all this has not shown itself so startlingly as in the homes of the just above marginal to comfortable group. Among these were the citizens who had struggled to get ahead. Many had begun to buy their own homes—to be sure, covered with heavy mortgages. Soon they saw their homes lost. Others of this group had savings either in so-called savings banks, in building and loan associations, or in commercial banks. One after another these institutions closed their doors. Then came the bank holiday and some of our

mighty banking institutions are now being liquidated.

Is it any wonder that one finds child after child, especially among the adolescent group, completely disillusioned about home owning, saving money for that rainy day, or trust in the honesty of his fellow man, particularly those in high places?

And what is the effect on the child whose father is a suicide? Not all those who suicide are fathers of families, but a goodly number of the approximately 23,000 who in 1932 so ended their lives were. Many, too, are discouraged adolescents who have found life not worth living. And Frederick L. Hoffman,¹ statistician, states that the situation "imperatively demands drastic social interference if a much more substantial rise to higher figures is to be avoided."

In our own clinic as we compared the material of the last several years with similar material previous to the depression we were struck at once with the greater complexity of emotional involvement. Hardly any case referred in these depression years fails to show evidence of the effect of the depression. In many instances this is not so much in the nature of the production of the problems presented but rather in the attitudes of the parents toward them. A characteristic statement of parents is the following: "Oh, I know I should try to understand the boy, but with all my other worries . . ."—the outgrowth of the depression, such as loss of job, home, savings, or extreme readjustments in living conditions such as moving in with in-laws, or into poorer neighborhoods, etc.—"his behavior drives me frantic." Some parents are a bit more honest and admit that their own emotional troubles are the cause of the child's conflict. May I here cite in highly abstracted form a case history that illustrates dramatically the effect of the parental problems on the life of

the child and the child's reaction thereto. In passing, let me state that, except for detail of the specific set-up, this type of problem has been a relatively common one since the depression began.

Mr. and Mrs. R. have been married 10 years. They have one child, a girl of 8. Mrs. R.'s endocrine state is such that she has not conceived again. Mr. R. has until these years always earned a good salary. Mrs. R. has had about everything of material goods she wished for. She was extravagant always and she found it difficult to adjust herself to the changing status of her husband's income. The little girl was over-protected and somewhat spoiled by both parents, and particularly by the father to whom she was very close.

With the reduction in income it became essential that the husband and wife agree on expenditures. However, the wife continued her extravagance or rather now failed to manage the little there was to the satisfaction of her husband. Quarrels ensued, witnessed by the child, as usually is the case. She was torn between father and mother. The father began to stay out late, and the mother's suspicions in due course were verified—there was another woman who sympathized with him to whom the man had turned in his trouble. All of this was told the child.

The child became increasingly fearful. She feared her father would not be home when she returned from school. This fear became overmastering. She refused to go to school. She would wake up very early in the morning and begin to sob. Breakfast was eaten amid tears. Then she had to be taken to school, and as she got to the steps she would vomit what little breakfast she had eaten. She feared to enter the classroom unless the teacher was in the room. If the teacher left the room, the child was thrown into such an anxiety state that she could not remain in the

room but would have to follow the teacher. Only as some semblance of harmony were reestablished in this home did these symptoms let up.

Other children in somewhat similar situations may develop more severe physical symptoms than just vomiting, and are seen in dispensary or consultation rooms and treated for this, that, or the other physical condition, when in fact the physical complaints are but symptom formation brought about because of emotional conflict states.

Another common complaint in which the depression plays a prominent part is stealing. To be sure, children stole before the depression, yet basically stealing is a "get even" reaction, and therefore is one well suited through which the child can express his feelings of unfair treatment. Such stealing may be money from the home, or the holding out of change when sent to the corner grocery, or the more serious crime of holding-up or breaking into homes and stores.

Children who previously had their little allowances are apt now to pilfer small change in order to continue having ice cream cones or candy. In some instances unsatisfied hunger adds to the urge. In other instances material possessions have become overvalued. The child had built his feeling of security upon such possessions and now, when that feeling of security and equality is badly shattered in all other respects, must enhance it through possessing things and under the circumstances that means stealing them.

Truancy in our experience is not so common an outgrowth of depression factors in young children as in older ones. In fact, we believe the truancy rate has declined to some extent among younger children of poor families because of the warmth of the school building and the food served there. Also the greater sympathetic understanding of school teachers has con-

tributed in our experience to a reduction of truancy. Among adolescents, however, certain truancy cases are the direct result of the depression. In the early years of the depression it was easier for the boy and girl of 16 to 18 years to get a job than for father or mother. Many a child seeing the sad financial plight chose to absent himself from school and seek to better the family fortune.

This brings us to a consideration of the effects on mental health of the child who not only truants from school but also absents himself from home. Many of the homeless boys, and girls too that one sees, left home because they either could not stand the constant nagging of relatives over their not having jobs when they themselves were perfectly aware none could be found, or they felt it best to get out so that there would be one less mouth to feed. Some few, very few, have had a fairly enjoyable time. They have seen the world and found it not so bad. The majority, however, seem to be having a miserable time of it. Most of them are disgruntled, weary, and footsore. Almost all of these are discouraged with life—they have found it bitter and without understanding. Dr. John Levy sums up well this problem of the homeless boy. He writes²:

One final question remains: What is going to happen to these fellows in the future? And this question is not nobody's business. As present economic conditions, as depressions repeat themselves, as these young men get older, reflect more and more frequently on the raw deal life seems to have given them, as they begin to read into the intangible causes of their downfall more specific motivation, as subsequent common working difficulties wipe out the heterogeneity of their background, as resistances are stirred up by authoritative opposition, stolid egocentricity will give way to more serious personality twists, more one-sided points of view, tensions, restlessness and need for motor outlets. From such social dynamics groups of psychopathic personalities are created. I wonder if revolutionists are not generated by the same

dynamics. I wonder if these same causes do not make revolutions possible.

And what about the homeless adolescent girls? To what extent are prostitutes truly recruited from their number? In Cleveland, and no doubt it is not an exception, each year of the depression has seen a greater number of girls picked up because of street soliciting. "The (police) department records also show that the girls arrested on vice charges today are much younger than they were in former years. The conclusion is that even youth has not been an influence in getting jobs in the past years."³

I have purposely avoided discussing the effect of malnutrition on the mental health of the child. With that phase all public health officials are fairly familiar although one could question to what extent the mental implications of malnutrition are understood. Cuts in school examination budgets, physical and psychological, will unquestionably lead to neglect in the correction of remediable defects and the proper placing of children in classes where they can achieve satisfaction. Out of such neglect divers kinds of problems arise—day-dreaming, inattentiveness, stubbornness when corrected for something the child is not able to control, bullying on the playground as a get-even reaction, truancy, etc. Attention, too, should be called to such economic measures as the elimination or sharp curtailment of shop courses of one kind or another, music, art, etc. Not only is this limiting the educational opportunities of all children but such elimination makes impossible the proper adjustment scholastically of many retarded children who find the three R's as taught beyond their ability to comprehend. Many a child will therefore be forced to serve time, all the while building up unhealthy emotional attitudes toward at least this phase of his life situation.

The best study of the effects of the depression on the mental health that has come to the attention of the writer is *An Unemployed Village*, by Paul Lazarsfeld.⁴ This study of the inhabitants of Marienthal, a village of Lower Austria, emphasizes "that parallel with the narrowing of the economic scope of these people, their psychic life has contracted." This psychic attitude the author defines as resignation, and he goes on to state, "this contraction of wants has a limit which cannot be exceeded. If it is reached, and if the external pressure continues to increase, the result is a catastrophic physical and psychic collapse." He finds that this holds true for children as well as adults.

In conclusion, permit me to state that, in my opinion, if ever there was a time for constructive work in the field of mental hygiene, now is that time. Only the unthinking can question the serious effects of these depression years on the mental health of both adults and children. In this field the morbidity rates have gravely increased.

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Free Medical Care for the Unemployed in Czechoslovakia

PROVISION of free medical care for the unemployed is to be organized and supervised, according to a recent ministerial decree, by a national council of government officials and representatives of trade unions and medical societies. The actual medical work will be done by local committees throughout the country. The unemployed and their families will be given, in case of illness, medical and hospital care and

medicines and other articles necessary for the treatment of illness. The cost of the medical care will be borne by the Social Insurance Institute, the Ministry of Public Health and the druggists' organizations. The physicians will give their time free of charge.

This system of relief has no connection with social insurance.—*Deutsche Zeitschrift für Wohlfahrtspflege*, Berlin, Aug., 1933.

The Treatment of Trade Wastes*

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INDUSTRIAL developments, such as have taken place on a gigantic scale during the past two decades, are largely the products of applied research. Intensive study with ingenious application of scientific facts or findings on a practical and economical basis have been responsible for much of our progress, particularly in the phenomenal development of mass production in this country. The trend has been steadily to increase production, efficiency in the utilization of raw materials having often been sacrificed in the efforts to speed up the wheels of industry. In recent years, however, there has been a tendency on the part of manufacturing concerns to give such matters more attention and apply research to reducing their industrial wastes for economic reasons as well as to solve problems confronting them involving the abatement of atmospheric and stream pollution.

The public has become increasingly aware of the harmful effects of unrestricted stream pollution. The uses of natural waters for drinking and domestic purposes; for watering of stock; for industrial water supply; for propagation of fish, oysters, and other aquatic life; for navigation; for power production; for agricultural development involving irrigation; and for recreational purposes, including bathing, boating, and fishing, particularly for

game fish—all these uses have been adversely affected in some degree by utilizing the same waters for the disposal of sewage and industrial wastes. Streams have been so grossly polluted in some cases as to render them absolutely unfit for normal uses. The result has been a growing demand that our natural waters be kept in a reasonably clean condition.

Public demand for clean streams in this country is evidenced by legislation enacted by many states and the federal government. The early laws tended to be absolutely prohibitory in nature, and were in a number of cases impractical of enforcement. Numerous damage suits arising from unrestricted pollution of streams, however, have been instituted, and the courts have in many instances upheld the rights of riparian owners under the common law to receive the waters flowing through their property "undiminished in quantity and unimpaired in quality."

Law enforcement alone does not provide the solution of many problems of pollution by industrial wastes. There are technical and economic, as well as legal, aspects to be considered. Accordingly the trend in recent years has been toward the establishment of governmental, industrial, and other agencies to undertake coöperative studies, to work out suitable means of reducing these wastes to a minimum, and to bring about the necessary stream improvement.

Industrial groups are becoming increasingly aware of the advantages of collective action in solving some of

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their common problems of waste utilization or disposal, as evidenced by the employment of engineers especially for this purpose by such organizations as the American Pulp and Paper Association and the American Petroleum Institute. There is already much evidence to show that the programs adopted by these various agencies are producing definite results and are materially beneficial in cleaning up the lakes and streams of the country.

The general policy underlying the various programs through which these results are being obtained calls for: (1) waste utilization to the greatest possible degree, and (2) if a pollution problem still exists, installation of any effective and practical method available or capable of being developed to treat and dispose of the waste in a satisfactory manner. With certain wastes, such as those produced in pulp and paper mills and in corn products plants, it has been found that by carrying waste utilization to its economic limits, pollution problems have been entirely eliminated or greatly minimized; and in these particular cases that the value of the substances recovered materially exceeds the cost of installation and operation of the recovery systems.

In order to illustrate the trend in procedures instituted to secure the solution of industrial waste pollution problems, the program being carried out by the Wisconsin State Board of Health may be cited. Activities relative to this program have for the most part been with the coöperation of the industries affected and in the main have included (a) the determination of the polluttional character of wastes from the state's larger industries, (b) research on and investigation of economically feasible ways and means of utilizing and of reducing the volume and strength of these wastes, and (c) educational and promotional measures to secure voluntarily indicated improvements. Steps taken

in dealing with three of the major industrial wastes problems, are briefly outlined:

Pulp and Paper Mill Wastes—Waste utilization and stream improvement activities by the Wisconsin pulp and paper industry and state agencies were started in February, 1926, following a meeting with mill executives held in Milwaukee. At this meeting it was pointed out that the mill wastes constitute one of the principal sources of stream pollution, but that no practical and economical methods of recovering or treating some of these wastes had yet been developed. Accordingly it was decided to seek coöperatively a solution of the various problems presented. To this end the industry appointed a committee of 7 to work with state officials in inaugurating and carrying out a definite program.

As a first step in this program all mills were called upon to determine fiber losses and take prompt action to reduce them to a minimum. With equipment available it was considered possible to render fibrous wastes negligible from the pollution point of view.

All pulp and paper mills in the state have been visited at intervals, to ascertain what steps had been taken in reducing objectionable fibrous and chemical wastes to a minimum and to foster further activity. Studies to obtain data for determining the fiber content and the polluttional value of wastes from each mill and for evaluating improvements in mill equipment and operation have been carried out in 1926, 1929, 1931, and 1932. Results of these studies have been published.^{1, 2, 3} In most of the mills efforts were being made to reduce white water wastes to a minimum through the installation of new "saveall" and recirculation systems. In some mills the fibrous wastes have been reduced to a practically negligible quantity.

This pulp and paper mill waste utilization and stream improvement program has been continuously carried on with the assistance of the committee on waste disposal of the Wisconsin pulp and paper industry. The effectiveness of chlorine-ammonia treatment for slime control in white water systems in pulp and paper mills has been further demonstrated during the past 2 years. Accordingly it is anticipated that more widespread use of information obtained will be effected during the coming year in establishing recirculation or closed systems for the white water, further reducing pollution by fibrous material.

It is further understood that progress has been made in the development of recovery processes for chemical wastes, such as produced in sulphate and sulphite pulp mills. Methods have been established for the re-use of lime sludge, which is produced in the operation of sulphate pulp mills, or its disposal as agricultural lime. Sulphite waste liquor utilization experiments are being conducted. One mill, which has been conducting pilot plant tests of the Howard Fractional Precipitation Process has reported: (1) that the process is commercially feasible to install and operate; (2) the values under Wisconsin conditions of the recovered products for making fresh cooking acid and for a boiler fuel will carry the process and show some net profit; (3) that the tail-liquor effluent from the process has much less oxygen demand than the untreated liquors and probably less toxicity to fish life. The next step will undoubtedly be a commercial scale demonstration of this process.

Studies were conducted to determine just how wastes from pulp and paper mills may interfere with the use of a stream for the propagation of fish. It is fairly well known that fish may be affected by pollution in any or all of the following ways: (1) direct killing through toxic constituents; (2) changes

in natural conditions, such as depletion of dissolved oxygen, so that fish seek another habitat either because of the condition of the water or the effect the wastes have on plants or lower animal life constituting their food; and (3) interference with the development of fish life and young fish, that is, influence on the reproduction of the species.

In comparing sulphite and sulphate pulp-mill waste liquors it was found that a direct toxic effect on the game fish used in the experiments might be expected when the wastes were diluted less than 1 part in 200 by volume. The wastes did not differ greatly with respect to the degree of dilution required to avoid destruction of fish by their poisonous constituents, presumably mercaptans or sulphur compounds. However, the sulphite wastes had a much greater avidity for oxygen than the sulphate wastes. Since these sulphite and sulphate wastes would probably deplete the dissolved oxygen in a stream below the critical amount necessary to sustain fish life before the limiting dilution of 1 part in 200 for toxic effects was actually reached, the most significant basis of comparison is their oxygen demand. Their relative effect on fish foods or reproduction of the species cannot be readily measured with our present knowledge.

If these wastes were compared according to their suspended solids or pulp fiber content, there would be practically no difference between them. Tests indicate that pulp fiber does not ordinarily accumulate in, and clog the gills of, fish causing death by suffocation. There is, however, the possibility of an indirect effect if fibers and other solids settle to the bed of a stream and decompose there, using up the dissolved oxygen necessary to support fish and other aquatic life.

Milk Plant Wastes—During the period 1927-1930 experimental work was conducted with 5 methods of treat-

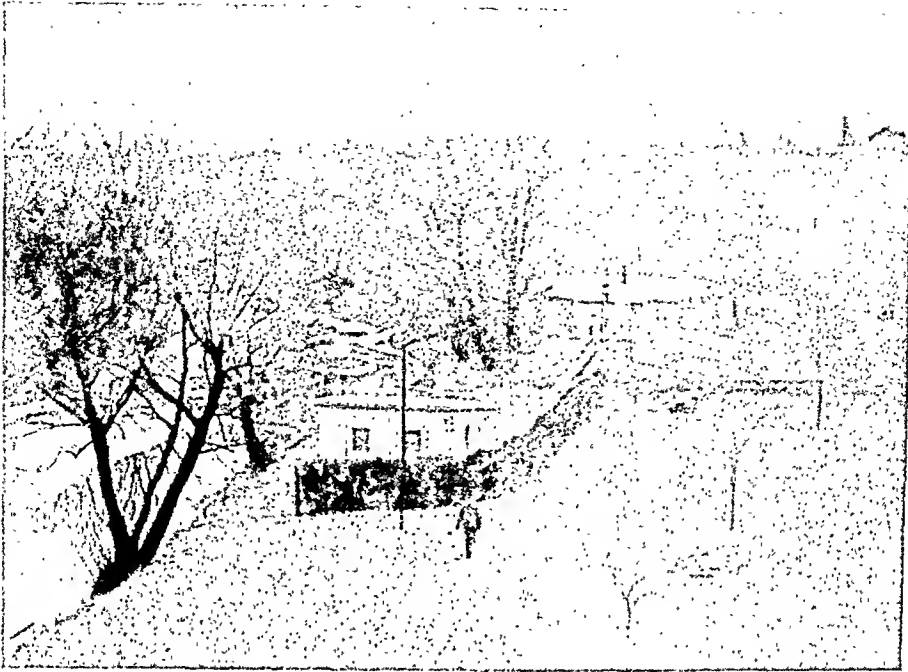


FIGURE I—Trickling filter for the treatment of milk plant wastes

ment for both creamery and condensery wastes at DeForest, Wis. Preliminary results were published during 1929.⁴ Further studies and observations along with results obtained in Iowa, Ohio, Michigan, and elsewhere, having shown

the feasibility of efficient and economical treatment of milk plant wastes by direct discharge on crushed rock filters, 10 full scale treatment systems of this nature have been designed and installed in Wisconsin since 1930.

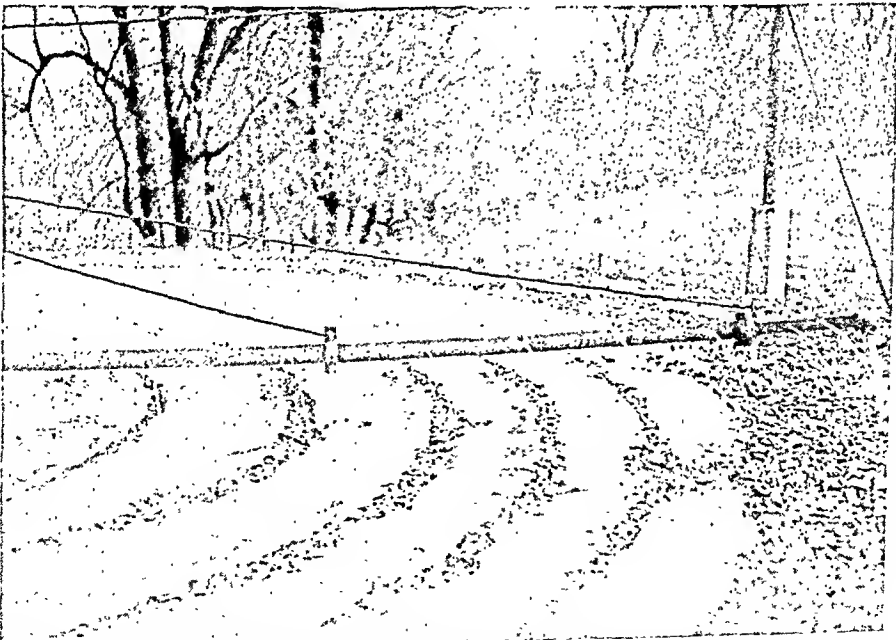


FIGURE II—Rotary distributor used in dosing a trickling filter for milk plant wastes—under winter operating conditions

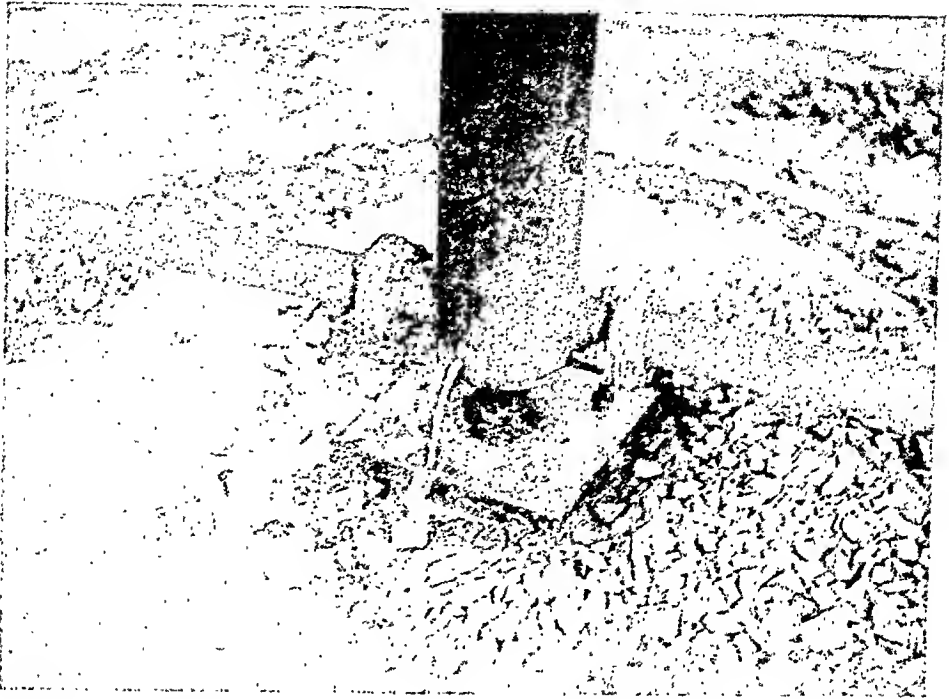


FIGURE III—Bleeder at the center of the rotary distributor of a milk waste filter to prevent freezing difficulties during winter operation

Further progress has been made during the past year in developing ways and means for effective treatment and inoffensive disposal of milk plant wastes. Trickling filter installations made during the preceding 2 years, based primarily upon the previously reported experimental work at DeForest, utilized tip-troughs for periodic discharge of the wastes over the filter surfaces. Slime accumulations on the distribution boards resulted in uneven dosage of the larger filter units. Accordingly two large milk waste treatment plants installed during 1932 were equipped with rotating distributors for the filters and, in one case, an automatic timing device for regulating the filter dosing cycle. Operating efficiency studies have been made at all of the milk waste filter installations completed to date. Results obtained have indicated that these trickling filter systems accomplish very effective removal or modification of pollutorial substances in the milk wastes.

Cannery Wastes—In October, 1925, cannery wastes were discussed before

the Convention of the Wisconsin Canners' Association at Milwaukee, and difficulties encountered in disposing of pea cannery wastes were outlined. It was pointed out that no satisfactory method of treating such waste had yet been developed, and that, while this was the problem of the industry, the state would cooperate in reducing objectionable stream pollution. A definite appropriation of \$500 by the industry was made to start experimental work during the following summer, in order to develop, if possible, practical and economical means of treating these wastes. The appropriation was made, and the results of this investigation are included in Part III of the report, *Stream Pollution in Wisconsin*. This work indicated that approximately 75 per cent of the pollutorial value of the wastes could be removed by chemical treatment, on the basis of 5 day B.O.D. results.

On the basis of information obtained during 1926, chemical treatment plants have been installed and operated at Wisconsin canneries where pollution

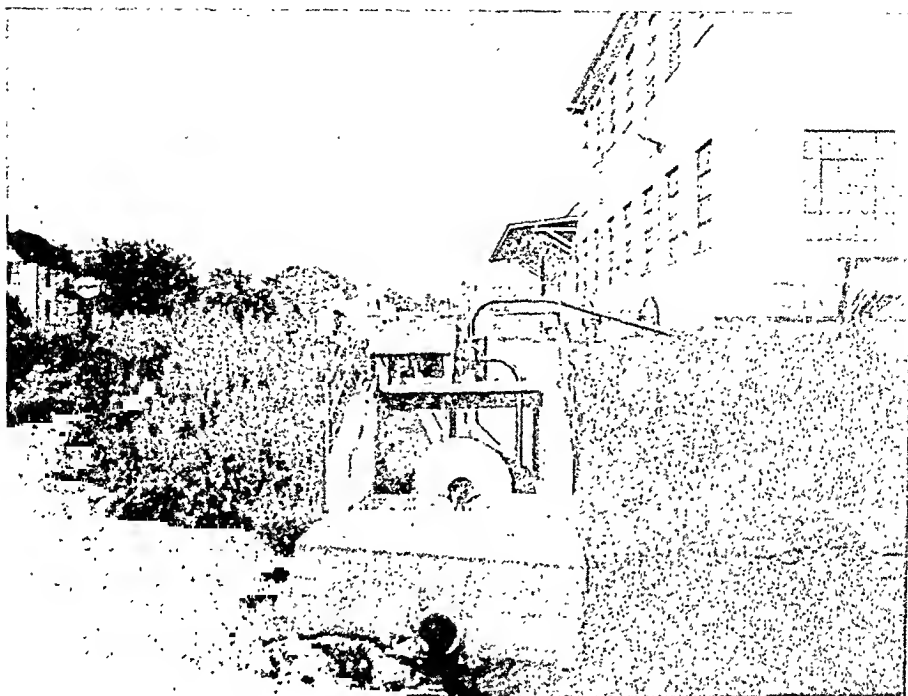


FIGURE IV—Rotary screen unit for removal of large solids from cannery wastes. Wastes are collected in the screen sump and pumped to the chemical treatment plant or to areas utilized for disposal by soil absorption

problems existed. Thirty-three treatment plants of the chemical precipitation type were available for treatment of cannery wastes in Wisconsin during 1933. In addition, most of the canneries have provided preliminary treatment for their factory wastes by screening, and some are using ground absorption for final disposal where soil conditions are favorable. Studies conducted of the treatment of wastes produced in the canning of beets indicated that by the application of 14 lb. of lime and $4\frac{1}{2}$ lb. of ferrous sulphate per 1,000 gal. of the composited washer, peeler, blancher, capper and other wastes incident to the beet canning process, a reduction of 96 per cent in suspended solids, and 50 per cent in 5 day B.O.D. can be effected in a fill and draw type chemical precipitation plant. In the treatment of carrot canning wastes the use of $7\frac{1}{4}$ lb. of lime and $3\frac{1}{4}$ lb. of ferrous sulphate per 1,000 gal. of wastes effected a reduction of 98 per cent in suspended solids, and

67 per cent in 5 day B.O.D. using the fill and draw process with a 2 hours settling period for the treated wastes.

In view of limited dilution available at the cannery where these studies were conducted the wastes were pumped into the dosing tank of a trickling filter at the municipal sewage treatment works. The effluent from the plant showed 82 p.p.m. total solids, 57 p.p.m. suspended solids, and 88 p.p.m. 5 day B.O.D. during the period these cannery and other wastes were being applied, entirely satisfactory for final disposal in the small stream available for dilution of the wastes.

A cannery company packing kraut located near the headwaters of a small stream flowing through a dairy region was confronted with a problem of so disposing or treating their wastes as to prevent a nuisance and "kraut" tastes in milk furnished by the cattle using the stream as a source of water supply. Lagooning or disposal of the wastes by soil absorption was impractical because

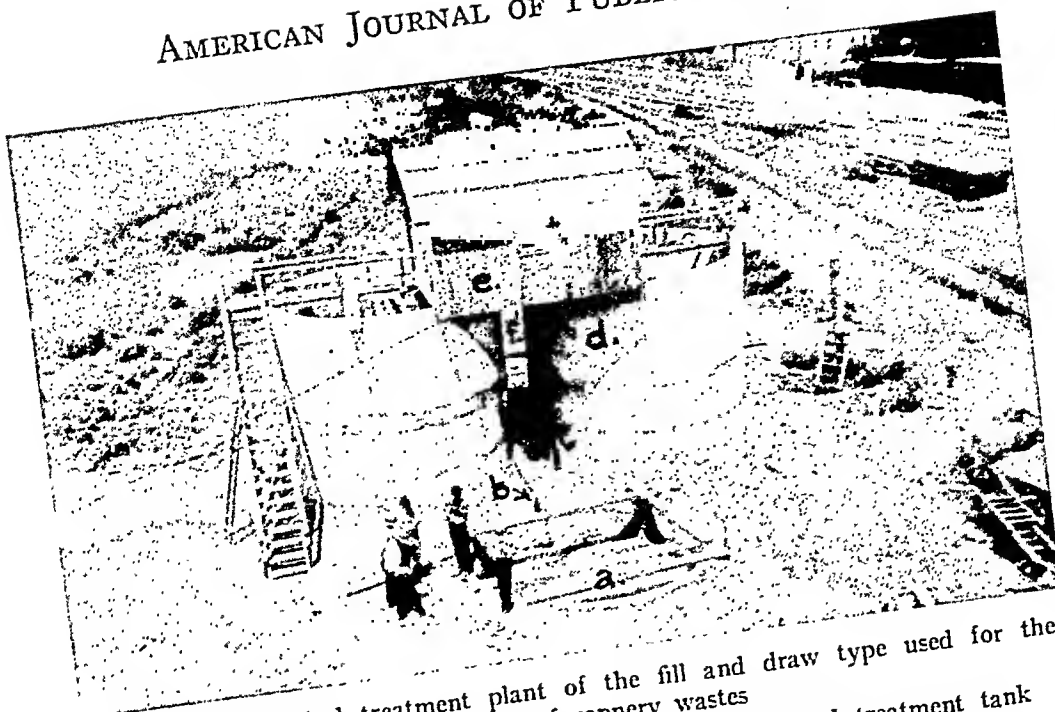


FIGURE V—Chemical treatment plant of the fill and draw type used for the treatment of cannery wastes

- (a) Sump
- (b) Float control for pump
- (c) Pump pit

- (d) Chemical treatment tank
- (e) Chemical storage house
- (f) Sludge drying beds

of the character of the soil and other local conditions. Studies were conducted and a treatment system was installed, including removal of gross solids by a 40 mesh rotary screen, chemical precipitation using alum and lime in fill and draw tanks, sand filtration using filters equipped for backwashing, and chlorination for the filter effluent. The treatment process has been successful in overcoming the objectionable conditions previously experienced.

Much of the activity outlined and improvements effected have been the result of coöperative effort. Research conducted by industry, state, and other agencies has pointed the way toward the solution of these waste utilization and stream improvement problems. When the effectiveness of a waste treatment or recovery process has been definitely demonstrated, and particularly when it can be shown that some financial return will be realized in con-

nection with such process, much objection on the part of industry to expenditures for improvements is overcome. A wide diversity of trade waste problems exists in this country, but it is believed that the common approach to their proper solution lies in mutual understanding and coöperation.

In conclusion, it is urged that the coöperative policies and procedures be extended and further developed by government, industry, and others concerned to the end that the most effective and economical solutions for industrial waste problems may be most speedily and satisfactorily accomplished.

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Why Not Save Hospital Beds?*

MARGUERITE A. WALES, R.N., F.A.P.H.A.

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FOR years Dr. Dublin of the Metropolitan Life Insurance Company has been urging visiting nurse organizations to place greater emphasis on the care of communicable disease in the home, even if it became necessary to reduce the maternity programs, which he considered unduly large. While we still believe the emphasis on maternity care is justifiable because of the opportunity for health teaching, recently our attention has become more definitely focused on communicable disease control by some studies made in New York City.

In 1931 a survey of the communicable disease hospital needs in one of the large boroughs of New York City was made under the guidance of a committee appointed by the State Charities Aid and working in coöperation with the Department of Hospitals and the Department of Health. Up to that time apparently no one had considered the relationship between a visiting nurse service caseload and the communicable disease hospital needs of a given community. In fact, some of the members of the committee saw no reason why the visiting nurse records should be included in this study. However, the director of the study, Anna Phillips, herself a public health nurse, insisted, and the significance of the visiting nurse figures is apparent in her report. As one member of the committee expressed it, "When I saw those figures showing

that the Visiting Nurse Service had given care to more patients in the home than were sent to hospitals I went straight to the Commissioner." To his surprise the Commissioner replied, that, of course, the Visiting Nurse Service had cared for communicable disease patients in their homes for many years.

This survey raised a number of questions in regard to the Visiting Nurse Service. First, was it true that the Visiting Nurse caseload was limited to milder cases? Second, was it true that a great many secondary cases developed when patients were kept at home? Third, did the Visiting Nurse Service send its sickest patients to a hospital and then omit the hospital deaths in its final fatality rate?

To answer these questions we made an analysis of our own records for 1932. As it was not possible to make a control study of hospital cases at this time, it was decided to use the same area (the borough of the Bronx) and the same 4 communicable diseases (diphtheria, scarlet fever, whooping cough, measles) as in the Phillips survey of 1931. This study showed that 12.4 per cent of the patients had complications before admission to the hospital; 16.6 per cent developed complications after admission—a total of 29 per cent of hospital cases with complications.

The study of visiting nurse records for one district (315 cases) showed 26 per cent of the cases had one complication, and that a total of 35 per cent had one or more complications. It is not possible to make a comparison between the hospital and Visiting Nurse

* Read before the Public Health Nursing Section of the American Public Health Association at the Sixty-second Annual Meeting in Indianapolis, Ind., October 10, 1933.

Service figures, since the present records of the Visiting Nurse Service do not indicate whether a complication arises before or after admission to the service; and it was also learned after the study was made, that the hospital total did not include some of the minor complications which were used in the visiting nurse study which was based on the classification of Willard Parker Hospital. Furthermore, as Miss Phillips points out in her report, no conclusions can be drawn from such a statistical study as there is no way of determining the previous condition of the patient, his susceptibility to disease, and so forth. The study did indicate, however, that the Visiting Nurse Service caseload is not limited entirely to the milder cases.

In the study of secondary cases it was decided to omit whooping cough and measles, as these are so often diagnosed too late to prevent secondary infection, and also diphtheria, as the number of cases was too small to be of interest.

It is significant that in the 309 families where scarlet fever occurred there were 124 families with younger children where no secondary cases developed. In the 38 families where there were 2 or more cases of scarlet fever there were only 19 patients where the onset of disease developed after the 7th day from the first visit of the nurse; a total of 5.4 per cent of the entire number of patients with a secondary case which developed after the 7th day.

With this low rate of secondary cases is it not reasonable to assume that risk of secondary cases (considering the low fatality rate) is less than the risk of cross-infection in overcrowded hospital wards?

Dr. Charles Hendee Smith, for many years director of the Children's Service in Bellevue Hospital, New York City, recently stated in a radio address that the best place for a sick child is in the

home, with 4 exceptions: for major operations; where special treatment such as transfusions are needed; where special equipment is needed for difficult diagnosis; or where home conditions are impossible. In the care of communicable disease, it seems to me that the question of home conditions is of primary importance. Dr. Best, Chief of the Bureau of Communicable Disease, recently requested that when our nurses ask for a diagnostician in undiagnosed cases where the family is unable to pay for a private physician, the nurse also indicate whether hospitalization seems advisable, thus showing the importance of the nurses' judgment on the home situation.

Of the 19 families where secondary cases developed after the 7th day, only 1 case was considered by the nurse as entirely satisfactory for home care.

During 1932 all cases of scarlet fever, measles, whooping cough, and diphtheria that were sent to hospitals after being seen by the Visiting Nurse Service, were followed up, and the deaths which occurred in hospitals were included in the total deaths for the year. In the 2,648 cases seen by the visiting nurses in the three boroughs of New York City served by the Henry Street Visiting Nurse Service, the deaths amounted to 16. Of these, 9 died in the hospital; 7 of these cases should be considered as "not nursed" cases since the nurse either made only 1 or 2 visits to urge hospitalization, or no nursing care was given as the physician in charge did not think it necessary. Nevertheless, the 16 deaths are included in our case fatality rate for the year. In 8 cases it was the nurse who first suggested and urged medical care or calling an ambulance.

In the 956 cases of scarlet fever death occurred in 2.

We appreciate the fact that further study is needed since up to the present Henry Street is the only nursing or-

TABLE I
SCARLET FEVER, 1932

	<i>Total Reported Cases</i>	<i>Total Deaths</i>	<i>Case Fatality Per Cent</i>	<i>Death Rate per 100,000</i>	<i>Per Cent Hospitalized</i>	<i>Per Cent Served by V.N.S.</i>
<i>Four Cities Over 1,000,000</i>						
New York City	21,093	134	.63	1.86	25.8	
3 Boroughs Served by V.N.S.	11,726	76	.64	1.73	28.5	8.1
Philadelphia	6,549	48	.70	2.46	67.0	3.0
Detroit	6,549	41	.60	2.74	47.0	7.5
Chicago	7,637	137	1.80	3.90	41.0	—

ganization which has followed up its hospital cases and included these in its final death rate. However, with the figures available from other cities we believe we have some facts which should set us thinking.

When preparations for this paper were begun it was taken for granted that the question of the safety of the care of communicable disease in the home in a generalized visiting nurse program had been settled at the Annual Meeting of the Association in 1925. At that time a forum was held on the question "Is the Public Health Nurse a Carrier of Infection?" Previous to the meeting, questionnaires had been sent to visiting nurse directors and health officers from coast to coast. From the replies received it was apparent that there was no *recorded* instance of a nurse carrying disease from patient to patient, and that many health officers were convinced that it was safe to carry on such a program. Furthermore, from the discussion which followed at the meeting many of us went away with the feeling that the safety of including this

service in a generalized program was an established fact. However, in 1933, it was found that in the 10 largest cities in the country there were only 5 visiting nurse organizations which were knowingly giving care to communicable disease patients.

In the tables the study has again been confined to scarlet fever. As Miss Phillips pointed out, scarlet fever is considered a major cause of seasonal overcrowding in hospitals. Her report showed that the average stay of a scarlet fever case in a New York hospital was 26 days. The hospital cost which she quotes for one hospital was \$8.86 per day in 1930, or an average of \$234 per case. The care of scarlet fever cases is then an important factor in city budgets.

Table I shows the 4 cities of over one million population. Here it is interesting to note that 3 cities have practically the same case fatality rate, and in all of these the Visiting Nurse Organization is permitted to give care to communicable disease patients.

One wonders, if a city can maintain

TABLE II
SCARLET FEVER, CHICAGO—FIVE YEARS

<i>Year</i>	<i>Cases</i>	<i>Deaths</i>	<i>Case Fatality Per Cent</i>	<i>Death Rates</i>	<i>Per Cent Hospitalized</i>
1928	4,335	78	1.8	2.40	34.4
1929	7,945	168	2.1	5.07	34.2
1930	9,599	199	2.1	5.89	32.1
1931	8,209	177	2.2	5.13	35.4
1932	7,637	137	1.8	3.90	41.2

a case fatality rate by hospitalizing 25 per cent of its cases, as low as that of a city hospitalizing 67 per cent, why there should be an increasing emphasis on hospitalization? The families do not want to send their children to hospitals—the children do not want to go, and certainly the tax payers are full of protests against unnecessary costs.

Since New York and Chicago represent opposite points of view in regard to home care, we have made a study of hospitalization and death rate for the past 5 years, which is interesting. Chicago does not allow the nursing service to give care to communicable disease patients, and maintains a high rate of hospitalization. Its case fatality per cent and its death rate, however, do not indicate for a 5-year period that great gain has been made by hospitalization.

tions—but Chicago was able to achieve the most favorable infant death rate of any large city for 1932.

Table IV gives a picture of the increasing caseload of the Visiting Nurse Service for the past 5 years, the actual number of cases having trebled, and the percentage of total reported cases showing a great increase. Since we had not definitely made a follow-up study of hospital cases previous to 1932, it seemed advisable to give the percentage of hospitalization of cases seen by the visiting nurses. It will be noted that during the last 2 years 10 per cent of these cases were sent to hospitals, but neither of the 2 deaths in 1932 occurred in the hospital, and the records indicate that in 1 case the nurse made every effort to have the patient hospitalized but was overruled by the family and physician.

TABLE III

SCARLET FEVER, NEW YORK CITY—FIVE YEARS

<i>Year</i>	<i>Cases (Five Boroughs)</i>	<i>Deaths</i>	<i>Case Fatality Per Cent</i>	<i>Death Rate per 100,000</i>	<i>Per Cent Hospitalized</i>
1928	10,586	69	.65	1.08	15.9
1929	7,952	68	.85	.99	18.8
1930	7,592	57	.75	.82	20.0
1931	11,900	84	.70	1.18	21.9
1932	21,093	134	.63	1.86	25.8
<i>Five Year Average</i>					
	New York City		.69	1.18	21.5
	Chicago		2.01	4.46	35.3

In New York City it will be noted that the death rate and case fatality per cent remain approximately the same throughout the 5-year period, and its per cent of hospitalization is much lower than Chicago. Here the Visiting Nurse Service is permitted to give care to communicable disease patients in the home.

A close-up picture of the average for the 5-year period is given in this chart for Chicago and New York City. The question naturally arises as to whether Chicago's emphasis on hospitalization is because of unusually bad home condi-

It seems particularly interesting that there are no deaths in the cases referred to hospitals by the visiting nurses. A study should be made of the relative time which elapses between the date of onset and date of admission to hospital on cases seen by the Visiting Nurse Service and those who have no such nursing supervision. The main object of this paper is to stimulate further study on this phase of public health work.

The public needs more facts on this question of home care. At Henry

TABLE IV
SCARLET FEVER IN NEW YORK
CARED FOR BY THE VISITING NURSE SERVICE IN FIVE YEARS

Year	Total Reported Cases	Cases Served by V.N.S.	Per Cent of All Reported Cases Served by V.N.S.	Number of Deaths V.N.S.	Per Cent Cases Served by V.N.S. Subsequently Hospitalized
1928	5,002	336	6.1	0	5.0
1929	3,257	226	6.9	1	6.1
1930	3,180	234	7.3	0	9.8
1931	8,506	621	7.3	1 (hosp.)	10.6
1932	11,726	956	8.7	2 (home)	10.5

Street we have developed communicable disease technics which have been approved by our Medical Advisory Committee and accepted by the Health Department, and no protests have come from the community served. This is interesting in view of the comment of the director of a visiting nurse organization which is not permitted to include the care of communicable disease in its generalized program. She writes: "Of course you and I know it is perfectly safe, but until the public knows it and believes it, it will not be done with the approval of the public."

In conclusion, there is one further point which I wish to emphasize. It is obvious that when a patient is sent to the hospital very little education in the principles of communicable disease control can be done in the family. In his article "Facts, Fallacies and Assumptions Concerning Communicable Dis-

ease Control,"¹ Dr. Carl E. Buck maintains that "the prevention and control of communicable disease is primarily the responsibility of the individual and the individual family. The educational efforts of the public health nurse constitute the most important factor in the development of this sense of responsibility in the individual."

Can there be any further doubt, then, in these days of measuring budgets and values of service, that this safe and economical way of providing care in the homes of communicable disease patients is of the utmost importance in a visiting nurse program? And finally, is it too much to hope that health officers will soon universally agree that the visiting nurse is a valuable aid in the control of communicable disease?

REFERENCE

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DISCUSSION *

LOUISE KUCK TOOKER, R.N.

Superintendent of Nurses, Health Department, Cincinnati, Ohio

A TRUE public health nurse, with eyes open to every opportunity of service, carries on a constant battle against communicable disease whether that function is listed among her agency's activities or not. Working in

homes, clinics, and schools, she does not wait until the community is faced with a communicable disease epidemic before she starts to teach age old habits of cleanliness and decency wherever she can.

Very definitely the public health

* Abstract.

nurse can insist upon keeping children away from sick people as the tuberculosis nurse has learned to do on her first visit to a family. This isolation is no less important in some other illnesses. It is equally important to keep the sick child away from other children, especially if he is classified as "not very sick" or "just getting a little cold." For, after all, does not the patient do most damage in the way of infecting others before he is sick enough to go to bed?

The public health nurse working in the school has a fine chance to enlist the coöperation of parents and principals in keeping children with colds at

home for a few days. In one of the Cincinnati suburban schools a committee from the P.T.A. assists in notifying parents that children are being sent home, and, if necessary, conducts little ones home. They have arranged cross files of friends with whom a child may stay if the mother is away.

Who better than the public health nurse can bring about early diagnosis and reporting of cases? Even some of the wisest mothers say to the nurse "I just thought I'd ask you; I hate to call in the doctor for every little thing." Yet seldom does a mother delay calling the doctor after the nurse points out the importance of doing so.

PASADENA

A.P.H.A. Convention City for 1934

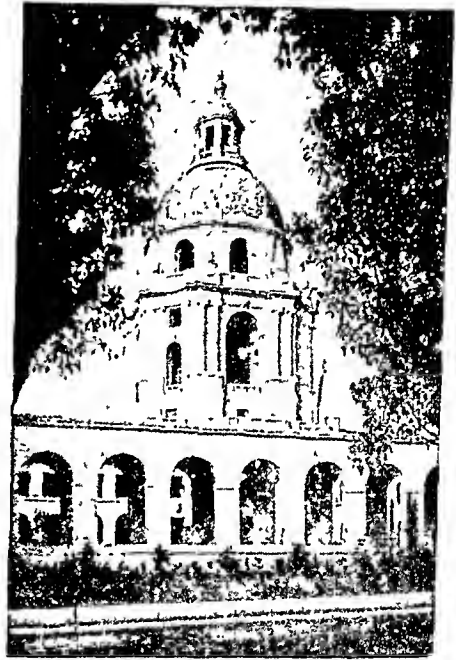
AS Pasadena has been honored by the A.P.H.A. in being selected as a meeting place for their convention in 1934, the city extends a most cordial message at this time to all who are planning to visit with us. It is that you will come as honored guests and for the length of your stay find happiness with us and carry away when you depart a bit of that glow about your hearts that your coming has given to us.

When Don Caspar de Portola and his band of explorers passed north in 1770, through the region now known as Southern California, they camped for a night near an Indian village in the foothills, overlooking a fertile valley. In the morning they awoke to view a spectacle of mountains and flowering valleys that brought forth exclamations of amazement and delight.

One hundred and four years later a group of sturdy pioneers from Indiana searching for a place to replant American homes and ideals that would bring happiness and security to their children selected that same spot which had delighted Portola and his followers. In 1875 this settlement, known as the Indiana Colony, formally adopted the name "Pasadena." It is a word derived from the Chippewa Indian dialect, meaning "Crown of the Valley." Since these early days many thousands from all parts of the globe have found here an ideal spot in which to live or spend a vacation.

The climate permits flowers to bloom and grass to be green the year around. Summer or winter, the days are delightful and the nights are cool. Weather Bureau statistics for 50 years show that January has an average temperature of 55, July of 71, a variation of 16 de-

grees. The average year has twelve days when the thermometer registers above 90, and thirteen days when it goes below 40.



City Hall

Within the city are many beautiful buildings and homes divided by streets lined with trees unsurpassed in nature's grandest contribution to her loveliness.

On the north are lofty mountains whose beauteous spots are easily accessible by well paved roads open summer and winter for those who love the mystifying grandeur of mountain surroundings.

To the west is a great natural gorge, the Arroyo Seco, its bed beautified with parks and its sides dotted with tile roofed villas.

To the south and east is California's great citrus domain.

Eleven miles away is the downtown



The Rose Bowl

center of the largest city in western America, the motion picture capital of the world.

There are a score or more of seaside resorts within 2 hours of Pasadena by interurban or motor car. Within 4 hours' drive to the south lies Mexico, and within nearly the same time north the giant redwood trees, the many lakes, and other grandeurs of the High Sierras.

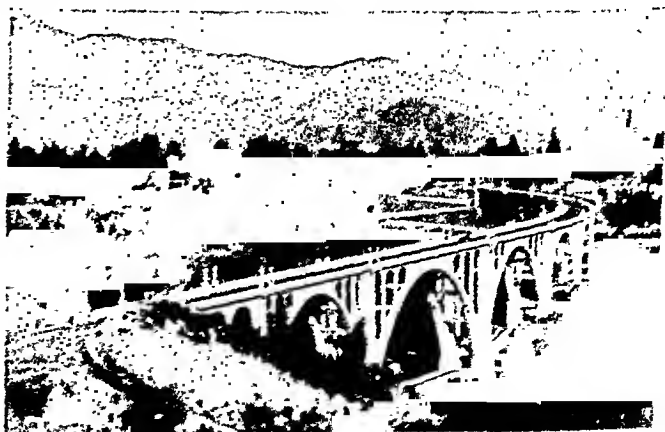
California Institute of Technology is in the front rank of American institutions devoted to technical education and research. Here are gathered professors of international repute in buildings and laboratories equipped with the latest instruments for scientific research. Approximately 500 students are enrolled from all parts of the world. Here is an institution worthy of one's visit, regardless of whether or not he is scientifically inclined. The famous Guggenheim Aeeronautical Experimental Station is located at the Institute.

Huntington Library—Ranking among the world's greatest museums, the Huntington Library comprises about 200,000 rare books and upward of 1,250,000 original manuscripts. The Huntington Art Gallery con-

tains the greatest collection of English portraits ever gathered under one roof. The collection is made up of 45 paintings—41 portraits and 4 landscapes—all outstanding works from the brushes of masters. The most famous painting in the gallery is Gainsborough's "Blue Boy," bought from the Duke of Westminster in 1921.

Mt. Wilson—On the summit of mile-high Mt. Wilson is situated the Mt. Wilson Observatory of the Carnegie Institution of Washington, D. C.—regarded as the world's foremost center of astronomical research. Equipment includes the world's largest telescope. The museum with its exhibit of astronomical photographs is open to the public for an hour each afternoon. Aside from the observatory, the summit affords an inspiring view of the San Gabriel Valley and the coast line beyond, and a delightful inn and dining room are on the summit. A very interesting astronomical lecture is given every Friday night.

Busch Gardens—A short distance south of the bridge are the famous Busch Gardens. The gardens are situated on the estate of the late Adolphus Busch, but are open to the public.



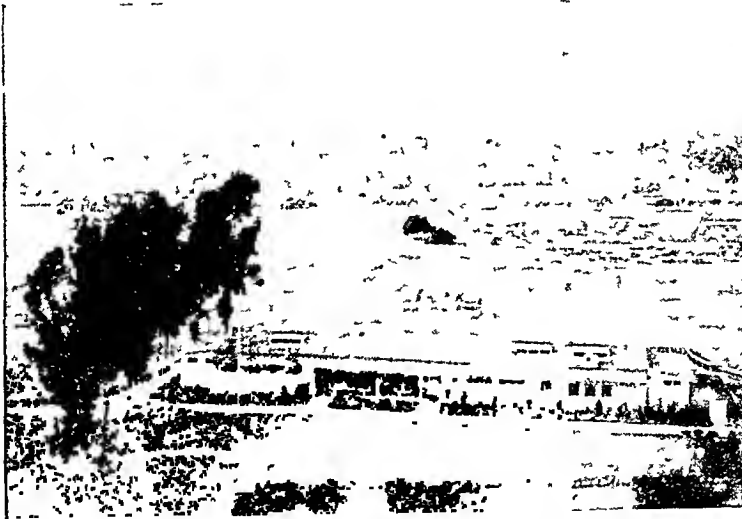
Colorado Street Bridge

Comprising 30 acres of beautiful landscaping, novel garden effects and rare horticultural specimens, they constitute one of Southern California's most renowned scenic attractions. The gardens are built on the east slope of the arroyo, and the natural topography of the land has permitted landscaping achievements hardly possible anywhere else. In variety of floriculture and magnificence of landscaping, they are said to excel all others. Along the eastern bank of the arroyo, winding paths, now climbing, now descending, lure one through a veritable fairyland of flowers and shrubs and trees, thickly set with secluded resting spots and populated by song birds. On the western side of the ravine, the steep, high cliffs are bright with the myriad colors of wild flowers. Scattered through the gardens are groups of statuary depicting familiar scenes from fairy tales. Tucked among the flowers and shrubs are tiny statues of gnomes and brownies.

Fourteen miles of walks wind through the gardens, twisting, turning, offering a new and beautiful picture at every bend.

The Los Angeles County Health Department, under the administration of Dr. J. L. Pomeroy, has developed an outstanding example of the district health center idea, and the County in coöperation with the various districts, has erected beautiful buildings well designed for this type of public health administration. These centers are well worth visiting, and it is planned to hold the first Health Officers Section meeting in one of them.

All the world knows Pasadena—its fame as a city of homes—the place where the quest for an ideal has ended. The inviting hospitality of Pasadena, its famed hotels, its unique recreational features, the delightful resorts of the Pacific, the broad expanse and mystery of the desert beckons you. We want you to share our pleasures and enrich us with your presence.



View Over the Municipal Golf Course

EDITORIAL SECTION

Expressions of opinion and statements of supposed facts are published on authority of the writer under whose name they appear, and are not to be regarded as expressing the views of the American Public Health Association, unless such statements or opinions have been adopted by vote of the Association.

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STATE CONTROL OF MILK PRICES

THIRTY years ago the Supreme Court of the United States held that reasonable regulation of milk in the interests of the public health was a valid exercise of the police power of a state. Since that time this court has handed down a number of decisions sustaining the power of the states to regulate the sanitary production of milk, and upholding the right of the states to prohibit or prevent the entry of impure milk and diseased cattle, and to delegate the supervision of milk supplies to local health authorities.¹

On March 5, 1934, the Supreme Court went even further when in a divided opinion it upheld the right of a state to determine the retail price of milk when an emergency exists. This noteworthy five to four decision sustained as constitutional a New York law which was adopted in April, 1933, as the result of an exhaustive legislative investigation of the dairy industry. This law authorized the creation of a State Milk Control Board, empowered it to fix wholesale prices to be charged or paid for milk, and required it to fix retail prices. The law, to be in effect only until March 31, 1934, unless extended, was upheld by the New York Court of Appeals and now has the sanction of the highest court of the land.

In this notable decision, Mr. Justice Roberts points out on behalf of the majority of the court that milk is an essential article of diet, that it must be properly safeguarded, that the dairy industry is of vast significance to the economic life of the people, that there is a huge surplus of milk, and that a satisfactory stabilization of prices for fluid milk requires that the burden of surplus milk be shared equally by all producers and distributors in the milk-shed. The opinion also states that milk is not a public utility, but that the milk industry is one that is subject to proper regulation in the public interest.

"Price control, like any other form of regulation," says the court in conclusion, "is unconstitutional only if arbitrary, discriminatory, or demonstrably

irrelevant to the policy the Legislature is free to adopt, and hence an unnecessary and unwarranted interference with individual liberty." In the opinion of the minority of the court, the price fixing of milk is not regulation, but improper management of and dictation to private business.

The effect of this decision will, however, be salutary, not only with respect to milk regulation, but to the whole recovery program. In previous editorials in this *Journal*² the problems of the dairy industry have been discussed, and it has been emphasized that an increased consumption of pure milk is essential to national health. It is the function of the health officer to enforce and maintain high standards of sanitary milk production and distribution and then to attempt to induce the public to use this high quality milk in beneficial quantities.

The economic and sanitary aspects of milk are so interrelated that they cannot be separated. Up to the time of the depression, milk consumption was increasing because of public confidence in the safety of market milk. Reasonable sanitary regulations, adequately enforced, tend to protect the reputable dealer as well as the public. Price fixing, if fair to all, accomplishes the same end, since it permits legitimate and honest business to sell milk at a small and reasonable profit and hold its trade without unfair competition from unscrupulous racketeers who are more interested in profits on low-priced milk than they are in pure and safe milk.

Both prices and sanitary regulations must of necessity be adapted to prevailing local conditions. Standards applicable to a metropolitan area in the North are obviously different from those governing a rural district in the South. But one thing is certain, and that is that any community can have clean and safe milk at a reasonable cost. One element in the attainment of that goal is the universal pasteurization of all milk, except certified.

Health officials should dedicate their efforts to this ideal, endeavoring at all times to maintain quality milk supplies, preferably pasteurized, and sufficiently attractive in purity and price so that the public will increase its consumption of our most nearly perfect and indispensable food.

REFERENCES

1. Tobey, J. A. *Public Health Law*. Williams & Wilkins, 1926. Also: *The Legal Aspects of Milk Control*. Reprint No. 939. U. S. Public Health Service.
2. Editorials: Milk Control and Public Health; and, Public Health and the Price of Milk. *A.J.P.H.* 24, 1:46-48 (Jan.), 1934.

REVISION OF THE FOOD AND DRUGS ACT

WE have already published one editorial¹ on the bill now before Congress providing for a revision of the Food and Drugs Act. We believe that as far as the protection of the public goes in this regard, this bill is second only in importance to the fight put up by the late Dr. Harvey W. Wiley. The editorial in question followed closely the resolutions adopted at our meeting in Indianapolis, which we reprint here, as they have been published only in the *Year Book*, and we desire to call them to the attention of all of our readers:

RESOLVED, that the American Public Health Association:

1. Express its confidence in the purposes and principles of the Federal Food and Drugs Act now before Congress for action; and
2. Solicit the support of all members of the Association to secure the enactment into law of the objectives of this revision, and
3. That this expression of the views of the Association be made a part of the record of this meeting.

Since that time the bill in question has been before committees; hearings have been held; and a very strong lobby for its defeat, or a modification of it which to all intents and purposes will defeat its chief objects, have been organized. Indeed, some modifications have been accepted by Senator Copeland who is responsible for it in the Senate, and a new one has been drafted by persons employed by the drug interests.

These bills are being carefully watched by food experts who are connected with our Association, and the *Journal* will report from time to time on the progress of events. It does not seem wise at the present time to take any particular stand further than has already been taken, but to watch developments. Our object now is to call our readers' attention to the resolutions already published by our Association and to urge them to keep in touch with what is going on in Washington concerning this bill. We cannot emphasize too strongly our belief that the matter is deserving of the most careful study on the part of all interested in public health and of the closest attention to the progress of events.

REFERENCE

1. *A.J.P.H.* Dec., 1933, p. 1295.

ORAL HYGIENE

ALMOST before the ink on our editorial (March, 1934), on oral hygiene was dry, there came to hand two publications^{1, 2} which deserve wide reading. While we recognize and deplore the orgy of tooth pulling which the medical profession indulged in for several years for every ailment from pip to ingrowing toenails, but which has fortunately abated, we still feel that dentistry is too little considered by the general practitioner, who is apt to view it from cosmetic and nutritional angles, but not enough from the standpoint of general health.

For those doctors who still feel that dentistry is apart from medicine, we may point out that as early as 1561, it seems that the work of the great French surgeon Paré was influential in placing dentistry on a physiological basis, while, in 1771, the great English surgeon, John Hunter, published a book, *Natural History of the Human Teeth*, and 7 years later a second one, *A Practical Treatise on Diseases of the Teeth*.

To this day, Hunter's work is recognized as the first attempt at a classification of the teeth, and still stands practically as he made it. His studies on the anatomy of the tooth have seldom been equalled, and never surpassed, and today are the foundation stones upon which all such work stands. While Hunter apparently did not relate diseases of the teeth with systemic disturbances, he did appreciate the necessity of proper occlusion, pointing out that irregularities in the second dentition were more apt to occur in the upper jaw than the lower one, owing to the comparatively larger size of the permanent upper set of teeth than the lower. He went further and claimed that the teeth were more easily moved backward than forward, and were more apt to remain fixed when moved back than when moved in the opposite direction. Certainly when men like Hunter and Paré found it to their advantage to spend time on dentistry, it behooves us, with our present and greater knowledge, to do something of the same sort.

It seems that the first person to call serious attention to the danger of systemic involvement from infected teeth was Dr. Willoughby D. Miller, a collegiate graduate of the University of Michigan, and a dental graduate of the

University of Pennsylvania in 1879. After graduation he went to Berlin where he had the opportunity of working in bacteriology under Koch, and in 1889, wrote *Microorganisms of the Human Mouth*. In 1891 a second publication appeared, *The Human Mouth as a Focus of Infection*, and during the same year, a third, *Pathogenic Mouth Bacteria*, which contained 23 illustrations.

While this work attracted the attention of bacteriologists, there is not a great deal of evidence that it had much effect generally, though we must give particular credit to a number of dentists who recognized that something new, and of importance, had been introduced into the practice of dentistry. The great awakening of the medical profession to the danger of oral sepsis was due to Sir William Hunter who, as early as 1900, published his book, *Oral Sepsis*, which fell on deaf ears, but who in Montreal, October, 1910, gave an address on "The Rôle of Sepsis and of Antisepsis in Medicine," which had a marked effect.

Perhaps the great majority of American physicians will credit this medical awakening to the late Dr. Frank Billings, who wrote on the effect of localized infections in endocarditis in an article called "Mouth Infection as a Source of Systemic Disease,"³ and also published his book, *Focal Infection*.

The first dental college was organized in Baltimore in 1840 by Drs. Horace H. Hayden and Chapin A. Harris. These men tried to inaugurate the teaching of dentistry in relation to medicine at the University of Maryland, but the authorities lost the opportunity of founding the first university school of dentistry by rejecting the offer, and the institution founded by them was devoted specifically to the education of dentists. However, Dr. Harris is credited as being the pioneer through whose efforts dentistry became a recognized specialty of the healing art. In reading the biographies of prominent dentists, one finds a surprisingly large number who obtained their training at this school. In addition to his service in helping to found the first school for dentists, Dr. Hayden called the convention to order when the American Society of Dental Surgeons was formed in August, 1840, while Dr. Harris was the first editor of the first dental journal, 1839. Other facts show that Dr. Harris was interested in the teaching of dentistry before the foundation of the Baltimore College.

Harvard University, in 1868, was the first university to found a dental school in connection with a university, where the degree D.M.D. is still given, which some of the dental profession interpret as indicating some degree of condescension toward the dental profession as such. The first dean of the Harvard School was Dr. Nathan C. Keep, who served an apprenticeship in dentistry, then obtained the degree of Doctor of Medicine at Harvard in 1827. Dr. Keep will be remembered by many in connection with the Webster-Parkman murder case, as it was he who identified the remains of the victim by the dental work in Dr. Parkman's mouth, which he had done. The University of Michigan followed Harvard in establishing a dental school in 1875, and next, the University of Pennsylvania established its School of Dentistry in 1878. Many other dental schools in connection with universities now exist, the private dental school, like the private medical school, having largely gone out of existence, aided by the survey of the Carnegie Foundation begun in 1922.

The year before the founding of the Baltimore College of Dental Surgery, the *American Journal of Dental Science* was founded, and in 1840, the American Society of Dental Surgeons came into being.

It is to be regretted that more about dentistry as a profession cannot be included here. Perhaps the next step forward was the study of oral surgery,

which had a profound influence on the profession of dentistry. Oral surgery in some ways touches more closely the medical profession, including surgeons, than does dentistry. It is stated that until comparatively recently there were only two textbooks on oral surgery available, one which Dr. James E. Garretson published first in 1869, and the other by Dr. John S. Marshall. In 1900, Dr. Thomas L. Gilmer published the lectures given to the senior class of the Northwestern Dental School, but on account of the scarcity of literature up to a few years ago, oral surgery was taught largely as a didactic subject.

The men who may be credited with having done much to put the subject on a firm basis are Dr. Matthew W. Cryer, who became Professor of Oral Surgery at the University of Pennsylvania in 1896, Dr. Truman W. Brophy, of the Chicago College of Dental Surgery, Dr. Thomas L. Gilmer, of Northwestern University, and Dr. Cyrenus G. Darling, of the University of Michigan. Both Drs. Brophy and Cryer were students of Garretson, and at one time Dr. Cryer was his first assistant. The subject of dental surgery is now well established. During the World War dentists and oral surgeons had unusual experiences and did a tremendous amount in the scientific treatment of fractures of the jaws and in restoring the facial contour to desperately wounded soldiers.

Space does not permit of the mention of all who deserve credit in this line of work. The great object of this editorial is to interest practitioners in what is unquestionably a most important specialty of the healing art, and to encourage the reading of history which will show how much we owe to a profession which is too widely separated from the average physician of the present day. May both professions recognize their opportunities and come closer together for the benefit of mankind.

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1. *Dental Cosmos*, Jan., 1934.
2. Mellanby, May. Diet and the Teeth. *Special Report Series*, No. 191, Medical Research Council, 1934.
3. *J.A.M.A.*, 1904.

ASSOCIATION NEWS

RURAL HEALTH CONSERVATION CONTEST LAUNCHED

W. K. Kellogg Foundation Makes Possible New Rural Health Conservation Contest

FOR the first time whole-time county and district health units throughout the United States will have an opportunity, this year, of participating in a national health contest such as the cities of the country have been competing in for the past five years.

This contest is made possible through a generous grant from the W. K.

Kellogg Foundation of Battle Creek, Michigan. As many of our readers know, it is this same W. K. Kellogg Foundation which is carrying on such interesting and promising studies and experiments in rural public health work in its several units in Michigan.

The Inter-Chamber Rural Health Conservation Contest, like the City

Contest, is carried on by the Chamber of Commerce of the United States in coöperation with the American Public Health Association. The purpose of this new contest is to promote sound rural public health practices, particularly through interesting the business man in public health and fostering a more effective coöperation, coördination and integration of the work of the several organizations and groups interested in, or carrying on, public health programs. This competition will be conducted along lines similar to the City Contest except that only full-time county health departments or district health units will be eligible to partici-

pate. The only requirements for enrollment are that the county or district health units have a full-time health officer and that such county or unit be entered by a chamber of commerce located in the county or district and affiliated with the Chamber of Commerce of the United States. Already some fifty counties have signified their intention of enrolling.

Further data on the contest are available either from the Insurance Department, Chamber of Commerce of the United States, Washington, D. C., or the Committee on Administrative Practice, American Public Health Association, 50 West 50th Street, New York City.

SCIENTIFIC OR EDUCATIONAL EXHIBITS

FOR a number of years the American Public Health Association has had in connection with its Annual Meeting a non-commercial exhibit variously referred to as the Scientific or Educational Exhibit. Last year a special committee of the Association was appointed to take charge of this exhibit and develop it for the greater interest of the delegates. In the exhibit presented at the Indianapolis Convention a beginning was made in this direction.

It is the ambition of the Committee on Scientific Exhibits to develop a feature for our Annual Meetings which in its way may be as valuable a contribution to the Annual Meeting as are the papers on the programs of the scientific sessions. We believe that there are many important activities in the public health field which can be presented better through the use of the exhibit method than by the presentation of a paper.

The committee requests that any member of the Association who has

some new, interesting, or important matter to present, which lends itself to presentation by the exhibit method, get in touch with the committee through the Association office.

The committee, of course, reserves the same right as the Program Committee, to accept material offered within the limits of the space available. The committee is naturally desirous that material prepared for the Scientific Exhibit be interesting as to method of presentation as well as to content, yet we appreciate that expert technic and unlimited facilities for the preparation of an exhibit are not available to all public health workers. Members of the committee are therefore ready to offer suggestions and advice to prospective exhibitors.

Communications for the committee should be addressed to Homer N. Calver, Chairman of the Committee on Scientific Exhibits, American Public Health Association, 50 West 50th St., New York.

NEW MEMBERS

The following list includes applicants who have been approved for membership in the A.P.H.A. by the Sub-Committee on Eligibility. These new members have requested affiliation with the sections indicated, and action by the Section Councils will follow.

Health Officers Section

- George R. Allen, M.D., Champlain, N. Y., Health Officer
 Joseph W. Belser, M.D., East Greenbush, N. Y., Acting Health Officer
 Lewis E. Bratt, M.D., Akron, N. Y., Health Officer
 Robert Brittain, M.D., Downsville, N. Y., Health Officer
 Marshall W. Brown, M.D., 73 W. Main St., Babylon, N. Y., Health Officer
 Ralph Frazier, M.D., Bergen, N. Y., Health Officer
 Donald B. Glezen, M.D., Cincinnati, N. Y., Health Officer
 Norman G. Gridley, M.D., 404 Main St., Horseheads, N. Y., Health Officer
 Francois Guimont, M.D., Pointe Basse, Iles de la Madeleine, P. Que., Canada, Medical Officer of Health
 Joseph Gutfreund, M.D., Eldred, N. Y., Health Officer
 Clifford H. Harville, M.D., 88 N. Main St., Warsaw, N. Y., Health Officer
 Aaron I. Levis, M.D., Madison, N. Y., Health Officer
 Louis A. Luttge, M.D., 42 Central Blvd., Central Park, L. I., N. Y., Assistant, Social Hygiene Clinic, Nassau County Public Health Commission; Taking Health Officers Course
 George A. McQuilkin, M.D., Varysburg, N. Y., Health Officer
 Alvia R. Morrow, M.D., Cazenovia, N. Y., Health Officer
 Ray P. Moyer, M.D., 620 City-County Bldg., Pittsburgh, Pa., Director, Pittsburgh Department of Public Health
 William D. Peckham, M.D., 1207 State St., Utica, N. Y., Health Officer, Consolidated Health District of Marcy and Floyd
 Paul S. Persons, M.D., 22 E. Main St., Ripley, N. Y., Health Officer
 Robert S. Pratt, 5725 Main St., Williamsville, N. Y., Taking Health Officers Course (Assoc.)
 Burton L. Rockwell, M.D., Oriskany Falls, N. Y., Health Officer, Augusta Marshall Townships
 Baylis F. Sloan, M.D., Walhalla, S. C., Medical Director, Oconee County Health Department
 Herbert B. Smith, M.D., 143 Pine St., Corning, N. Y., Commissioner of Health
 Claude H. Vadney, M.D., Lyons Falls, N. Y., Health Officer

Laboratory Section

- Dr. Tomas Padro y Alvarez, Heredia alta 15, Stgo de Cuba, Orte, Cuba, Chief Chemist of the Laboratories of the Sanatorium of the Spanish Colony in Central Gallego
 Dr. Leasure Kline Darbaker, 424 Franklin Ave., Pittsburgh, Pa., Professor of Microbiology, Pittsburgh College Pharmacy
 Nelle M. Fishel, B.S., City Hall, Des Moines, Ia., City Bacteriologist
 Clifford D. Gallagher, M.D., Faxton Hospital, Utica, N. Y., Director of Hospital Laboratory
 Margaret Hotchkiss, Ph.D., 146 Halsey St., Brooklyn, N. Y., Instructor in Bacteriology, Public Health, etc., N. Y. Homeopathic Medical College and Flower Hospital
 George Ives, M.D., 3720 Washington Blvd., St. Louis, Mo., Clinical Pathologist
 Alfred W. Jackson, M.D., D.V.M., 124 Main St., Albion, N. Y., Health Officer
 Samuel T. Lindsay, M.D., St. Mary's Hospital, Rochester, N. Y., Laboratory Director
 Howard C. Maffitt, 522 Eleventh St., Des Moines, Ia., Consulting Chemist
 Maurice R. Moore, M.D., W. W. Backus Hospital, Norwich, Conn., Director of Laboratory
 Theodore A. Olson, B.S., State Dept. of Health, Div. of Sanitation, Minneapolis, Minn., Biologist
 Clarence C. Ruchhoft, B.S., 845 S. Wabash Ave., Chicago, Ill., Bacteriologist, Sanitary District
 Joseph I. Schleifstein, M.D., 785 Park Ave., Albany, N. Y., Associate Diagnostic Pathologist, Div. of Laboratories and Research, State Department of Health
 Gustav Selbach, M.D., 66 Elizabeth St., Dansville, N. Y., Director, Livingston County Laboratory
 Harold L. Smith, B.A., 217 Park Place, Ash-tabula, O., Bacteriologist
 GERAL A. VACHA, M.S., Rm. 527, State Office Bldg., St. Paul, Minn., State Bacteriologist

Public Health Engineering Section

- Roy M. Harris, B.S., 1504 Alaska Bldg., Seattle, Wash., P. H. Engineer, State Department of Health
 Eugene O. Leonard, Ph.G., Department of Health, Pocatello, Idaho, City Chemist
 Gustavo Noguera S., Apartado 1509, Bogota, Columbia, S. A., Chief Engineer, National Public Health Department (Assoc.)

Carlos B. Ruiz, Apartado No. 76, Torreon, Mexico, Manager, Torreon Water Works
Lynn M. Thatcher, 126 State Capitol, Salt Lake City, Utah, State Sanitary Engineer

Public Health Nursing Section

Luella Tanner, R.N., P.H.N., Hoolehua, Molokai, T. H., Public Health Nurse
Ruth Tappan, R.N., 225 N. Washington Ave., Battle Creek, Mich., Director, Crippled Children's Service, W. K. Kellogg Foundation
Cora Warrant, R.N., 130 Spring St., Rochester, N. Y., Director, Public Health Nursing Association

Industrial Hygiene Section

Clarence E. Ralston, Pittsburgh Plate Glass Co., Grant Bldg., Pittsburgh, Pa., Safety Director (Assoc.)
Martin E. Tyrrell, M.D., Transit Road, Depew, N. Y., Health Officer and Industrial Physician

Child Hygiene Section

Marguerite Holman, M.D., 56 Grant St., Jamestown, N. Y., School Physician
Robert R. McCormick, M.D., 204 W. Main St., Endicott, N. Y., Industrial Physician
Dominic M. Nigro, M.D., 512 Argyle Bldg., Kansas City, Mo., Commissioner, Child Hygiene

Public Health Education Section

Harrison A. Allen, M.D., Box 66, Endicott, N. Y., Medical Supervisor of Schools
May M. Brown, 132 W. First St., Los Angeles, Calif., Librarian, Los Angeles County Health Department (Assoc.)
A. Morris Ginsberg, M.D., 724 Argyle Bldg., Kansas City, Mo., Chairman, Heart Committee, Health Conservation Association
Arthur F. Hall, Jr., M.D., Lincoln National Life Foundation, Fort Wayne, Ind., Assistant Director, Life Conservation Division
Marie C. Harrington, M.A., 609 Chamber of Commerce Bldg., St. Louis, Mo., Health Education Director, St. Louis District Dairy Council
Virginia M. Palmer, M.D., 5 Valley Road, Scarsdale, N. Y., Medical Inspector, White Plains Public Schools
C. R. Skinner, M.D., 447 Warren St., Hudson, N. Y., Deputy Health Commissioner and School Physician
Myral M. Sutherland, R.N., Mary McClellan Hospital, Cambridge, N. Y., Superintendent
Mary H. Westfall, D.D.S., 804 Odd Fellow Bldg., Indianapolis, Ind., State Director, Good Teeth Council for Children

Epidemiology Section

Florence B. Benell, M.S.P.H., 3500 W. 12th Place, Chicago, Ill., Student (Assoc.)
John E. Gordon, Ph.D., M.D., Herman Kiefer Hospital, Detroit, Mich., Medical Director, Division of Epidemiology

Unaffiliated

David M. Hackwell, M.D., Holland, N. Y., Health Officer
Foster Murray, M.D., 80 Hanson Place, Brooklyn, N. Y., Director, Tuberculosis Division, Kingston Avenue Hospital
George A. Taylor, 451 Century Bldg., Pittsburgh, Pa., Secretary, Pittsburgh District Dairy Council

Sustaining Member

Lincoln National Life Foundation, Fort Wayne, Ind.

DECEASED MEMBERS

N. J. Randolph Chandler, Plainfield, N. J., Elected Member 1914, Fellow 1923
J. Frederick Hempel, M.D., Baltimore, Md., Elected Member 1920, Fellow 1923
William Herbert Lowe, D.V.S., Paterson, N. J., Elected Member 1906, Fellow 1923
William L. Munson, M.D., Granville, N. Y., Elected Member 1919, Fellow 1922
Linsly R. Williams, M.D., New York, N. Y., Elected Member 1914, Fellow 1922
Edward J. Denning, M.D., Boston, Mass., Elected Member 1919
W. S. Downham, M.D., London, Ont., Canada, Elected Member 1919
Pierre G. Fermier, M.D., Leesburg, Ind., Elected Member 1931
C. P. Fryer, M.D., Dr.P.H., Maryville, Mo., Elected Member 1922
Alfred F. Hess, M.D., New York, N. Y., Elected Member 1913
Wyman D. Jacobs, M.D., Averill Park, N. Y., Elected Member 1926
Joseph E. Masson, M.D., D.P.H., Montreal, P. Que., Canada, Elected Member 1933
J. S. McBride, M.D., Seattle, Wash., Elected Member 1933
Dr. Gaston Melo, Mexico, D. F., Elected Member 1932
W. Ophuls, M.D., San Francisco, Calif., Elected Member 1920
S. M. Shoemaker, Eccleston, Md., Elected Member 1927
Arthur B. Chandler, Montreal, P. Que., Canada, Elected Member 1931
Charles H. Voorhies, M.D., Lexington, Ky., Elected Member 1921
Alonzo Blauvelt, M.D., New York, N. Y., Elected Member 1917
Prof. Henry W. Farnam, New Haven, Conn., Elected Member 1914

LABORATORY

STUDIES WITH STANDARD AGAR AS EMPLOYED IN MILK CONTROL WORK*

C. S. BOWERS AND G. J. HUCKER

Laboratory of the Board of Health, New Britain, Conn.; Agricultural Experiment Station, Geneva, N. Y.

I. A COMPARATIVE STUDY OF YEAST AND BEEF EXTRACT MEDIA

YEAST extract has been reported to be excellent for the cultivation of many different types of organisms which either do not develop generally on standard medium or whose colonies are so minute that they are observed with difficulty.

In order to determine whether the substitution of yeast extract for beef extract in standard medium would increase its efficiency when used to estimate the number of bacteria in milk, a series of 514 samples of raw and pasteurized milk were plated upon standard medium, standard medium with yeast extract substituted for beef extract, and plain peptone agar, and incubated at standard temperature. These samples were representative of the usual sources from which milk control laboratories receive samples; that is, directly from cows, from milk receiving stations, from different points in pasteurizing plant operation, from delivery vehicles, and from retail stores. In addition, they were representative samples of various grades of milk both raw and pasteurized.

The yeast extract counts of 373 raw

milk samples were 9 per cent lower than those secured with standard agar, while the counts of 141 pasteurized milk samples were 20 per cent below the standard count. Standard medium produced a maximum plate count from 65 per cent of all samples included in the study while the yeast medium yielded the highest count in 25 per cent.

Slightly larger colonies developed in many instances on the yeast extract medium but this characteristic was not constant, since organisms which produced the pin-point type of colony were slightly larger on the yeast medium in some cases but in others the colonies were more minute than on the standard medium.

It is concluded that the advantages of yeast extract for the plating of fluid milk are insufficient to warrant its use as a substitute for beef extract in the standard medium.

II. THE EFFECT OF A MODIFIED STANDARD MEDIUM FOR THE DETERMINATION OF THE BACTERIAL FLORA OF MILK

Many workers engaged in the sanitary control of milk supplies have criticised standard medium because it has often failed to indicate the presence of certain types of organisms found in milk. As a result a plate count has frequently been secured which did not

* Read before the Laboratory Section of the American Public Health Association at the Sixty-second Annual Meeting in Indianapolis, Ind., October 12, 1933.

Approved by the Director of the New York State Agricultural Experiment Station for publication as *Journal Series No. 39*.

give an indication of the actual number or types of bacteria present. The results of the previous study confirmed the observation of others that yeast extract was more beneficial to some organisms than it was to others. As a consequence an additional investigation was begun in the Division of Bacteriology at the Agricultural Experiment Station in Geneva, N. Y., to ascertain whether the efficiency of modified standard medium could be enhanced by the addition of yeast extract, and to determine further if the inclusion of yeast extract in media was responsible for increased size of colonies.

In order to observe what effect the use of certain modifications of standard medium would have upon the number and types of bacteria which would develop from milk, the plate counts from a series of 27 normal and 23 abnormal raw and pasteurized milk samples were secured by employing standard agar with and without dextrose, yeast extract agar with and without dextrose, plain peptone agar, beef and yeast extract agar with and without peptone, and Difco yeast dextrose agar which contained beef extract, yeast extract, tryptophane broth, peptone and dextrose.

Samples of raw milk which were considered normal were composite samples from a herd at the Agricultural Experiment Station, from producers supplying milk to a pasteurizing plant in Geneva, N. Y., and from a receiving station at Oxford, N. Y. Some of the abnormal raw milk samples were secured from cows segregated from the station herd because of suspected mastitis, and others were from different samples of raw milk which were collected immediately after the evening milking and stored at 25° C. overnight.

Samples of normal pasteurized milk were taken from the plant at Geneva and others were received from New York City and Boston, Mass. Samples of pasteurized milk which were held at

10° C. for 12 days and pasteurized milk samples which were suspected of containing thermophilic bacteria were considered as abnormal pasteurized milk samples. Incubation of plates was at 32° C. and 37° C. for 48 ± 4 hours.

Difco yeast dextrose agar allowed the development of the greatest number of colonies in 45 per cent of all samples at standard incubation and in 48 per cent of all samples at 32° C. In no instance did standard medium give a maximum plate count. The addition of dextrose to standard medium resulted in higher plate counts than were secured with yeast extract plus dextrose, and the colony size was increased more by the addition of dextrose than by the addition of yeast extract to standard medium.

In the vast majority of cases all media were conducive to higher counts when plates were incubated at 32° C. than at standard temperature. Standard medium plate counts were higher at 32° C. than at 37° C. in 86 per cent of the cases. However, the effect of the difference in temperature of incubation upon the magnitude of the count was less appreciable when yeast extract was added to standard medium; only 56 per cent of the standard medium plus yeast extract counts were higher at 32° C. than at 37° C. Counts secured with Difco yeast dextrose medium and incubated at 32° C. were approximately 4 times as great as those secured with standard medium at standard temperature.

In the authors' opinion too little consideration has been given in the past to the ease with which the number of colonies appearing on a plate can be counted. Standard agar is a gross offender in this respect and it was exceedingly noticeable in the present study, since all media, with the exception of plain peptone in a few instances, yielded colonies which were larger than those on standard agar. Usually these

colonies could be counted with ease by the naked eye and without the aid of artificial illumination. On the other hand, it is quite apparent that any successful attempt to do away with the troublesome problem of minute colonies must also result in higher plate counts. The problem seems to be one which is due to unsatisfactory nutriment more than one of time and temperature.

From the results of this study it is concluded that:

Yeast extract is not superior to beef extract for plating both raw and pasteurized milk.

The combination of yeast and beef extract in a medium for milk plating

is more efficient than the use of either one separately.

Neither yeast extract nor beef extract materially increases the number of colonies over plain peptone agar.

The addition of a fermentable carbohydrate to standard medium generally causes an appreciable increase in count and colony size.

The addition of glucose to standard medium increases the count approximately $2\frac{1}{2}$ times more than the addition of yeast extract.

Counts obtained with the present standard temperature may give a false impression of the actual number of bacteria present in milk.

THE MECHANISM OF BACTERIOPHAGE LYSIS*

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ON the basis of experimental evidence secured in the study of the mechanism of lysis in the presence of moderate initial concentrations of bacteriophage, the conclusion was reached that progressive disappearance of organisms during the period of phage regeneration (and before its concentration has reached the maximum level) is due to bursting. This is brought about through an increase in the rate of cellular metabolism, which results in the increase in osmotic pressure and imbibition of water, leading to swelling and finally to disruption of cells.

However, if the concentration of phage is initially at a limiting level, or when it approaches this level as the result of regeneration, the susceptible bacteria are killed and subsequently

digested without undergoing the changes just described.

By setting up a competition for water between the bacteria and the medium (as in the case of 4 per cent agar, for instance), both the swelling and lysis of bacteria are prevented. However, if to such a medium is added 4-5 per cent of urea, both the swelling and the lysis of bacteria again take place.

On the other hand, while increase in competition for water prevents both the swelling and lysis of bacteria, the effects of the presence of phage are not totally abolished. Indeed, bacteria which come in contact with phage under these conditions still exhibit heightened metabolic activity, as indicated by marked increase in the rate of multiplication. While this effect is particularly marked under the conditions which preclude lysis, the growth-promoting effect of phage can be detected also under the

* Abstract of paper read before the Laboratory Section of the American Public Health Association at the Sixty-second Annual Meeting at Indianapolis, Ind., October 11, 1933.

ordinary conditions when the lysis is not inhibited, particularly on ordinary solid media. Moreover, if the initial concentration of phage is kept sufficiently low, so that the obscuring effect of concomitant lysis of progressively increasing numbers of bacteria is minimized, it is possible to detect this growth-promoting effect in ordinary broth cultures, both in terms of turbidity changes of the whole culture and by count of surviving bacteria.

Thus it appears that the primary

effect of phage consists in the stimulation of bacterial metabolism. This effect can be elicited under all conditions employed in these experiments, irrespective of whether lysis takes place or not.

The lysis proper is a secondary phenomenon, which occurs as a direct result of imbibition of water by the bacteria following the osmotic changes set up by the increased metabolism. Whenever this imbibition of water is interfered with, the lysis is prevented.

VITAL STATISTICS

Birth Rates and Illegitimate Births in Germany and Other European Countries—In 1932 Germany, Italy, and Poland had a marked decline in the birth rate. In the German reich the number of living births receded by 53,600. In Italy the number of living births was 34,150 fewer than in 1931, so that in 1932 the birth rate for Italy was only 23.8 per 1,000, as compared with 24.9 per 1,000 the previous year and 26.7 in 1930. In Poland in 1931, 50,000 fewer births were recorded, and in 1932 there was a further decline of nearly 34,000; the birth rate of Poland dropped, over the 2-year period, from 32.3 (1930) to 28.7 per 1,000 population. In the remaining countries of western, central, and northern Europe the decline in the birth rate ranged from 0.2 to 0.7 per 1,000. France had a decline in its birth rate of only 0.2 per 1,000. In Sweden and Hungary the birth rate was only 0.2 and 0.3 per 1,000 population, respectively, lower than in 1931, whereas Great Britain and Czechoslovakia showed a decline of 0.5 and Austria a drop of 0.7 per 1,000. Unchanged

birth rates were recorded in the Netherlands and in Switzerland.

The countries of lowest birth rates at present are the German reich, Austria, Sweden, and Great Britain, with birth rates ranging from 14.5 to 15.8 per 1,000. France (with a birth rate of 17.2), Belgium (18.1), and Switzerland (16.7) have in recent years passed out of the group of nations with the lowest birth rates. The birth rates in Norway (16.7), Denmark (18.0), and Finland (19.5), together with Lithuania and Estonia, range around that of France and in some cases exceed it. In countries bordering on this area, limitation of births is making further progress, particularly in Czechoslovakia, Hungary and Italy, which countries report, in contrast to former high rates, birth rates of from 21 to 24 per 1,000, which are lower than the birth rate of the German reich in 1923 (26.9). The birth rates in the countries of the Iberian peninsula (28.3 and 30.7) and in eastern and southeastern Europe are still high. There appears to be evidence, however, that the demographic pressure of the Slavic races of the East

will in the near future lose considerable of its force. It may be added that in 1932 the population of Japan increased by 1,007,868 (in 1931, by 861,534).

The percentage of illegitimate births in Germany (12.1) is exceeded by that of only one European country (Sweden with a percentage of 16.1). The corresponding percentage in Greece is 1.4; Bulgaria, 4.0; Great Britain, 4.6; Italy, 4.9; Norway, 7.1; France, 8.4; and Denmark and Czechoslovakia, 10.7.—*J.A.M.A.* 102:308 (Jan. 27), 1934.

Health Conditions in New York State, 1933—In attempting to evaluate the effects of the fourth year of the intense economic depression upon the health of the people of New York State, it is essential to realize that vital statistics, or to use the more comprehensive term, demography, can give us only a partial picture of the situation. In 1933, as could be anticipated, the downward trend of the birth rate continued. At the same time, the marriage rate has risen about the minimum for the preceding year.

The general death rate of 11.2 per 1,000 population, however, is the lowest ever recorded in the state. The significance of this fact is likely to be misunderstood or misinterpreted. Some superficial, and one might say callous observers have stated that the drop in the death rate indicates the beneficent effects of economic deprivation. This, of course, is not true. All that one can say is that official and private aid has not permitted the workers who were thrown out of their jobs to starve to death; that official and private health agencies have been able, in the face of increasing difficulties, to carry on and even to expand their preventive and curative activities.

The number of marriages recorded in

the entire state in 1933 was 106,295, an increase of more than 5,000 over the preceding year; the marriage rate was 16.0 per 1,000 population as compared with 15.5 in 1932. The 1933 birth rate of the entire state was 14.0, the lowest ever recorded. The number of births was less than in 1932 by almost 13,000. With but few exceptions, the birth rate of the state has been moving downward since 1914 when the maximum figure of 24.6 was recorded. In the brief interval 1927–1933 it has dropped more than 25 per cent—from 19.0 to the present minimum of 14.0.

The rate of infant mortality, 54 deaths under 1 year per 1,000 live births, was practically equal to the minimum recorded in 1932. The disquieting rise in maternal mortality, which was first noted in 1930, continued; the 1933 rate, 60 deaths per 10,000 total births, was the highest in 15 years. The increase above the rate of 1932 was due entirely to a rise in the mortality from puerperal sepsis, the rate for the former year being 18.5 and the 1933 rate, 19.9.

Death rates from several important causes established new minimums for all years. The rates from whooping cough (2.2 per 100,000 population) and diphtheria (1.1) have never been lower; the latter was about half of the previous minimum of 2.1 registered in 1932. The pneumonia death rate (91.2) has never been lower; rates below 100 were recorded only twice before, in 1921 and in 1932.

Of the diseases that are most directly influenced by economic want, tuberculosis undoubtedly is one of prime importance, and yet its death rate has dropped to the lowest point in the history of the state (59.0)—a reduction of more than 50 per cent since 1920.

In view of the nation-wide attention focused upon lethargic encephalitis by the St. Louis epidemic, it is interesting

to note that the mortality from this cause in New York State (0.6) has never been lower.

Compared with 1932, decreases were recorded in mortality from scarlet fever (1.7) and diseases of the heart (289.6). The mortality from alcoholism (4.7) has not been lower since 1922, and the rates of suicide (17.4) and homicide (5.3) were the lowest since 1929. The death rate from fatal accidents (67.8) has been lower only once. Noteworthy in this group is the reduction of fatal automobile accidents,

the rate (21.1) being the lowest since 1926; the highest rate ever recorded in the state was 25.5 in 1929.

Among the more important negative facts is the rise of the death rates from cancer (127.5) and diabetes (30.3) to new maximums; the measles death rate (2.5) was the highest in 5 years; there was also a slight increase in the mortality from diarrhea and enteritis among children under 2 years of age, the rate being 6.8 compared with the minimum of 6.5 in 1932.—*New York State Health News*. 11:29-30 (Feb. 19), 1934.

INDUSTRIAL HYGIENE

Some Cases of Carbon Tetrachloride Poisoning in Connection with Dry Shampooing and Dry Cleaning with a Survey of the Use and Action of the Substance—The action of carbon tetrachloride on the human organism is discussed. Carbon tetrachloride has a protoplasmic-injuring action with the same narcotic potency as chloroform. Occupational carbon tetrachloride intoxication presents a rather characteristic picture which consists of a headache accompanied by nausea and vomiting, with a subsequent development of hepatitis or nephritis with their characteristic symptoms.

Several uses of carbon tetrachloride and the accompanying dangers are discussed. This substance is used largely in place of benzene for the removal of grease, extraction of fats, solvent for crude rubber, fire extinguishers, and as an anthelmintic drug. It has also found a popular use in Denmark in connection with shampooing. Several histories of carbon tetrachloride intoxication from this as from other occupational sources are given and discussed.

The author feels that carbon tetra-

chloride can be used more advantageously than benzene as a solvent if the public can be instructed as to the toxicity of the substance and methods of handling it without danger to life and health. Carbon tetrachloride would be, however, prohibited as a shampoo.—Knud O. Møller, *J. Indust. Hyg.*, XV, 6:418-431 (Nov.), 1933.
L. G.

Health Aspects of Radium Dial Painting. III. Measurements of Radioactivity in Workers—This study considers the amount of radioactive substance found in the living human body by the measurement of radioactivity in the workers employed in the radium dial painting industry. Gamma ray, radon and thoron determinations were made by various electroscopic tests which are described in detail. The average gamma micrograms of radium readings are as follows: radium transfer press operators, +0.16; painters from +0.23 to +1.70; and dusters, +1.03. The probable error of measurement in the tests was about 0.3 micrograms.

The results of the study showed that

high gamma-ray concentrations were confirmed by high radon or thoron readings, or both, indicating that in general individuals giving a high gamma-ray reading are radioactive. There is little evidence to believe that the radium dial painters would become radioactive during the first year of service, but after the first year there seems to be definite evidence of the accumulation of radioactive material. There was, however, little correlation between radioactivity and length of exposure. Other factors such as degree of exposure, personal cleanliness, working conditions (factory housekeeping), and individual susceptibility were of greater importance. There was definite indication that the accumulation of radium in the body of the workers was associated with the degree of radioactivity of the atmospheric dust to which they were exposed.

In order to have some standard of comparison electroscopic determinations of a known quantity of radium emanation distributed in a cadaver were made. Radon seed was injected into the body and measurements were taken with the cadaver arranged in an identical position as when determinations were made on workers. Finally the sensitivity of the electroscope was checked against a 10 mg. standard of radium.—James E. Ives, Fred L. Knowles, and Rollo H. Britten, *J. Indust. Hyg.*, XV, 6:433-446 (Nov.), 1933. L. G.

Health Aspects of Radium Dial Painting. IV. Medical and Dental Phases—This paper concludes the report of an investigation of the radium dial painting industry by the U. S. Public Health Service, and deals with the medical and dental phases of the problem. The results of this study indicate no correlation between radioactivity or exposure to radium and

blood pressure changes, radium burns, or change in finger prints. Slight reduction in the red cells count showed 4.3 million R.B.C. per c.c. for 196 women radium workers as compared with 4.5 million per c.c. for the 31 controls, and in the hemoglobin determination which gave an average of 13.2 gm. per 100 c.c. of blood for 196 women radium workers, and 14.0 gm. per 100 c.c. for the 31 controls. The change in the total white cell count was not significant.

Examination of mouth, teeth, and bone showed no stomatitis such as might be associated with metallic poisoning but disclosed focal atrophy and focal sclerosis. There was definite relation between these dental findings and exposure to radium. Workers having more than 4 micrograms of radium showed bone changes.—Louis Schwartz, F. C. Makepeace and H. T. Dean, *J. Indust. Hyg.*, XV, 6:447-455 (Nov.), 1933. L. G.

Experimental Inhalation of Bituminous Coal Dust and Its Effects Upon Primary Tuberculosis Infection in Guinea Pigs—This study was carried out in an industrial plant where experimental animals were exposed to an average concentration of 84 million particles of coal dust under 10 microns in diameter per cu. ft. of air. The coal was characterized by a high carbon content and a relatively small amount of volatile matter and silica. The animals were divided into five small groups which consisted of: (1) normal guinea pigs exposed for varying intervals to the inhalation of soft coal dust to produce maximal reaction in their lungs; (2) guinea pigs infected with attenuated tubercle bacilli 10 days before initial dust exposure; (3) presumably uninfected anthracotic guinea pigs which were infected by the inhalation of attenuated tubercle bacilli 115

days after the completion of 1 year and 9 months' dust exposure; (4) guinea pigs similar to the preceding group except that the animals were infected by the inhalation of a more recently isolated strain (H 60) of human tubercle bacilli of moderate virulence; and (5) animals infected with virulent tubercle bacilli 10 days previous to exposure in the plant.

The results of the experiments seemed to indicate the following:

(1) soft coal did not penetrate the lungs as much as quartz or carborundum. There is little cellular fibrosis in the connective tissue sheaths of bronchi and blood vessels but rather a more marked fibrotic action in the medulla of the mediastinal lymph nodes. The general nature of the reaction is comparable to that observed in the human lung; (2) soft coal dust is eliminated rather slowly from the lungs of guinea pigs (three years after discontinuing an exposure 2 years in duration, subpleural pigmentation was still marked); (3) there may be some protective action by inhaled bituminous coal dust against the development of a tuberculous infection.—Leroy U. Gardner, Donald E. Cummings and Gerald S. Dowd, *J. Indust. Hyg.*, XV, 6:456-465 (Nov.), 1933. L. G.

Time Limitation in Compensation for Industrial Diseases—The difficulties experienced in the application of a time limit in compensation cases for occupational diseases in New York State and Minnesota is discussed. The phraseology of the law is such that the time limit for compensation claims provides a difficult medico-legal problem. This is particularly true when the industrial diseases are cumulative in character.

The author advocates the adoption of a time limit in industrial compensation laws which is, in one way or an-

other, specifically related to the time of leaving the employment. The time limitation would then be more or less determinable and would avoid controversies experienced by the compensation legislation of New York State and Minnesota, which bases the time limitation upon the date when an occupational disease is "contracted."—May R. Mayers, *J. Indust. Hyg.*, XV, 6:465-472 (Nov.), 1933. L. G.

Bureau of Mines Approved Devices for Respiratory Protection—

This article deals with the activities of the Bureau of Mines in preparing minimum requirements for safety and durability of respiratory devices, and devising tests to ascertain the ability of the equipment to meet the requirements before giving approval to them. Specifications and tests have been prepared for self-contained oxygen breathing apparatus, canister gas masks and for hose masks. Any equipment which has been granted an approval by the Bureau of Mines is required to maintain approval standards. The Bureau of Mines has done much to stimulate the production of improved respiratory devices as well as to protect the consumer from faulty and unsatisfactory devices for respiratory protection. A selected list of references to respiratory devices is given.—W. P. Yant, *J. Indust. Hyg.*, XV, 6:473-480 (Nov.), 1933. L. G.

Diurnal and Seasonal Variations in the Small Ion Content of Outdoor and Indoor Air—This is a study of the ionic content of outdoor and indoor air conducted at the Harvard School of Public Health at Boston, Mass. Daily ion counts (small ions) were made over a period of 3 years, between May, 1930, and May, 1933.

The results of the study indicate a definite diurnal and seasonal variation

in the ionic content of the atmosphere depending largely upon local and general meteorological conditions. Daily peaks occurred shortly after mid-day and mid-night, and the low points occurred between 6 and 10 p.m., and 4 and 8 a.m. There was a distinct seasonal maximum during the summer months and a minimum during the winter months.

Interdiurnal changes of temperature and humidity appeared to be the most important climatic factor affecting the small ion content of outdoor air. A drop in the interdiurnal temperature and humidity was preceded or accompanied by a sharp rise in the ion content of the air and *vice versa*, provided that the drop or rise in temperature and humidity did not continue for more than 2 days.

Cloudiness, high humidities and precipitation seemed to influence the ionic content of the atmosphere. Significant reductions in the number of small ions were noted at all seasons. Heavy precipitation resulted in a considerable increase in negative ions from the Lenard effect.

It was found that the concentration of small ions in indoor air was considerably lower than that in the outdoor air in the winter. In the summer the reverse held true. Persistent bad weather tended to equalize the indoor and outdoor ion content.—C. P. Yaglou and L. C. Benjamin, *Heating, Piping & Air Cond.*, 6, 1:25-32 (Jan.), 1934.

The Therapeutic Uses of Polarized Air—The ionic content of the atmosphere is being recognized as appearing to be of great medical importance. This study presents the results of polarized air treatment of 84 patients to whom 1,200 treatments were administered. Each treatment extended over a period of 15 minutes and the doses administered varied from 10 to 20 million ions per c.c. of air. The results of the treatments are as follows:

Diagnosis	Improvement	Moderate Improvement	No Improvement	Patients 1-3 Treatments
Sinusitis	6	13	14	16
Asthma	2	8	5	6
Ess. Hypertension	4	1	1	2
Vasomotor Rhinitis	3	—	—	2
Atrophic Rhinitis	—	—	1	—

While the experimental series is too small to permit any definite conclusions, the author feels that this procedure shows therapeutic possibilities in certain types of sinusitis, asthma, essential hypertension, and vasomotor rhinitis.

There is a general discussion of ions with particular reference to the type, size, velocity and distribution of ions in the atmosphere. Methods of producing ions are briefly discussed and a description of the Dessauer Ionization Apparatus is given.—William Bierman, *Arch. Phys. Therapy, X-Ray, Radium*, XIV:133-137 (Mar.), 1933. L. G.

"Nose-Opening" Rays—This study repeats the work of Leonard Hill, who claims that all dark sources of heat are "nose-shutters," and that bright, incandescent sources of heat act as "nose-openers." Blind persons were chosen as subjects to rule out certain psychic factors which Hill claimed were acting as inhibitors of the phenomena. The subjects were seated in a chair screened from drafts and light, by a shelter, and exposed to a bright source and then to a dark source of heat for a certain interval. Inspiratory and respiratory pressure were recorded by a sensitive manometer of the aneroid type which was connected to one nostril.

The results of the study failed to confirm Hill's observations and indicated that the "nose-closing" is probably caused by any rapid warming of the skin and that it is not dependent upon any particular quality of radiation. Screening from the heat source or sponging a small area of the skin with

cold water gave immediate relief in the experiments.—A. F. Dufton and T. Bedford, *J. Hyg.*, XXXIII, 4:476-484 (Nov.), 1933. L. G.

The Mortality Experience of an Occupational Group Exposed to Silica Dust Compared with that of the General Population and an Occupational Group Exposed to Dust Not Containing Silica—This is a very interesting statistical analysis of the mortality experience of an occupational group exposed to silica compared with that of a general or standard population and an occupational group exposed to dust not containing silica. By standardizing the deaths it was found that the comparative mortality figures for all causes and all ages (20-65) were 1,000 for the standard population, 1,984 for the silica group, and 967 for the

non-silica group respectively. Comparative mortality experienced in the silica group for 23 causes or cause groups, showed only 3 causes (diabetes, appendicitis, and other diseases of the digestive tract) with mortality not significantly different from that of the standard population. Very high mortality (over double that of the standard population) were noted due to pulmonary tuberculosis, other tuberculosis, chronic rheumatism, bronchitis, chronic interstitial pneumonia, other diseases of the respiratory system, and hernia.

In the non-silica occupational group mortality for influenza, pulmonary tuberculosis, bronchitis, chronic interstitial pneumonia, and other diseases of the respiratory system was higher than that of the general population.—Edgar L. Collis and G. Yule, *J. Indust. Hyg.*, XV, 6:395-417 (Nov.), 1933. L. G.

CHILD HYGIENE

MATERNAL AND CHILD WELFARE WORK IN RUSSIA

TWO recent publications^{1, 2} have been received from Russia which set forth an interesting and unique program for the protection of motherhood and childhood under way in the Soviet Union. The philosophy and activities of the socialist state as related to maternity and child hygiene are clearly portrayed.

The protection of motherhood and childhood is one of the most important problems of the Commissariat of Public Health. It occupies a special place in the social policy of the Soviet State as a whole. The importance of this problem is immediately connected with the rôle and place which the working woman of the land of Soviets occupies in state construction, in social life and in industry in all its stages and forms, as one participating in all its activities with a perfect equality of rights.

The principal points which characterize the Soviet code of laws for the protection of maternity are:

1. The woman working in a factory who is engaged in physical labor is released from all work for a period of 8 weeks before and 8 weeks after her confinement, with full wages. If she is an employee or worker in a mental profession her leave is 6 weeks before and 6 weeks after her confinement.
2. A woman cannot be discharged during her pregnancy and motherhood leave. She must be reaccepted to her work after her leave.
3. The nursing mother in addition to the usual intervals of rest during work is entitled to no less than half an hour every 3½ hours of work. These periods of interruption in her work are counted as working time.
4. The pregnant or nursing mother cannot be sent on missions. No overtime work or night work is allowed for pregnant and nursing mothers. The pregnant woman has the right to receive a railway ticket or necessary information in Soviet offices out of turn.
5. In U.S.S.R. the mother is made economically independent by being insured in the State Social Insurance Organization. It

is the state organization and not the working woman that pays this fee in its entirety.

The social insurance of motherhood is carried out by giving the woman help in the following cases:

1. For pregnancy and delivery
2. For the infant's feeding, for his care and for nursing him during illness
3. For free medical care

The assistance for pregnancy and motherhood is paid to those insured during the full time of their leave according to clause 132 in the measure of their full wages during this period.

4. Those insured and their wives in the case of child birth receive additional assistance granted but once for the care of the newborn. This assistance is equal to the average monthly wages for workers of the given locality. Another sum for the child's food equal to the fourth of the average monthly wages of the given locality is paid every month during 9 months beginning from the day of the child's birth.

PRESCHOOL INSTITUTIONS

Preschool education in Russia was one of the weakest links in public education before the Revolution. In 1913 there were only about 200 institutions for it in the whole country.

Immediately after the Revolution, a rapid growth of kindergartens and other preschool institutions set in; they numbered thousands even in the first years of Soviet power, which were those of civil war. But the growth of national economy in town and country, the entering upon the reconstructive period called for a still greater extension of the preschool net as well as of that of creches.

The growth of preschool education which the first Five-Year Plan had in view has not only been achieved, but has been carried out in an eight- or nine-fold measure—thus, by the end of the first Five-Year Plan (1932), 500,000 children were to have been enrolled in the R.S.F.S.R., whereas in reality their number exceeded 4 millions.

By the end of the second Five-Year Plan period in 1937, the number of children benefiting by the service of educational in-

stitutions must reach in the R.S.F.S.R. a figure of 10.5 millions.

In progressive districts of the Union an enrollment of all preschool children has nearly been completed. In Moscow even by the end of the year 1932 preschool institutions had absorbed 90 per cent of all the children of workers, and in the Ural industrial centers—75 per cent.

Among the public organizations rendering help in the work of education and of improvement of sanitary conditions for preschool children a prominent place has been taken by the preschool coöperation, which has considerably grown of late. Many millions of parents have been drawn into the work of preschool education, especially mothers, who take this task to heart and consider it to be of the greatest importance. It is to public assistance and support that the rapid growth of preschool education is due. In the year 1932 upwards of 70,000 kindergarten teachers were trained at courses of short duration, and in 1933 upwards of 80,000 will be trained in the R.S.F.S.R. alone. . . .

Preschool institutions are of varied types including:

- (a) The kindergartens without boarders
- (b) The kindergartens with boarding section
- (c) The children's rooms attached to clubs
- (d) The children's rooms attached to the schools for adults (for the mothers who are studying)
- (e) Children's playgrounds out of town and in town: in courtyards, on boulevards, in green squares, in parks
- (f) Children's homes for orphan preschool children. . . .

The time which the child spends in the preschool institution varies according to the nature of the occupation of its parents, but as a rule it is at least 7-8 hours and sometimes 10-12 hours a day. This is especially true as regards kindergartens attached to enterprises where women are mainly employed. A large number of dormitories are now attached to the kindergartens. The child is taken care of both during the day and at night time. In Moscow in 1932, of 65,000 children in kindergartens 19,000 were boarders. Their number more than doubled in the course of 6 months. . . .

The great tasks with which the country is confronted in the second Five-Year Plan has greatly enhanced the political importance of the further development of preschool education.

The rapid growth of the network of preschool institutions during the last few years, the attention paid to them by proletarian

organizations, the mobilization of local resources of the country, of the population itself for the construction of kindergartens and playgrounds, enable us within the next few years to realize for the first time in the world the task of introducing universal preschool education in the land of the Soviets.

By the end of the second Five-Year Plan all children from 3 to 7 will have been embraced by preschool education.

We have already begun to tackle this task.

In 1932, 85,000 new preschool teachers were trained. The stationary pedagogical school alone cannot in the near future cope with this task. The main work will have to be done by means of short-term courses which are organized all over the country (3, 5 and 8-months courses). However, the stationary institutions will gradually increase in number, until they will fully supplant the short-term courses.

The main task at the present time is to select the best of the students after their completion of the short-term courses and give them a thorough training. The main task will be to show them the work of model kindergartens, to acquaint them with the achievements of the more advanced and successful ones. Therefore a network of model preschool institutions and district pedagogical cabinets is being set up. Each district, as a rule, has not only a preschool inspector but also a "methodist" (specialist) introducing the more up-to-date methods. Many new advance courses for preschool workers are set up, as well as pedagogical consultative departments for conducting work with the parents.

Special stress is being now laid on the quality of the work. This is the surest method of guaranteeing continued successes.

The quantitative increase in and the qualitative improvement of preschool institutions are closely bound up with each other and together they constitute the great task of bringing up the children of the Soviet Union in the communist spirit.

The broad masses of the population and the social organizations of the U.S.S.R. are all actively participating in creating ever more and more kindergartens, in their qualitative improvement, in bringing about universal preschool education.

REFERENCES

1. *Protection of Motherhood and Childhood in the Soviet Union*, by Dr. E. Conus, People's Commissariat of Health of the R.S.F.S.R., State Research Institute for the Protection of Motherhood and Infancy, 1933.
2. *The School in the U. S. S. R.*, Vol. I-II, 1933 of V. O. K. S., Bi-Monthly Periodical Published by The Soviet Union Society for Cultural Relations with Foreign Countries.

EDUCATION AND PUBLICITY*

THE AUDIT.

SUPPLEMENTARY to the main elements of a social educational publicity program should be a merciless personal audit of the finished project. After the returns are all in—when the last meeting has been held, the final distribution of printed matter made, and all activities of the immediate effort have been recorded as history—is the time to put yourself and your methods through the third degree.

Accept with becoming modesty the compliments of friends and well wishers. Then seek your chronic kicker and solicit him to unburden himself. He may be inaccurate and will surely be unfair, but out of it you may get some leads for further examination in seeking how better to plan and administer the next time.—Elements of a Social Publicity Program. *Proceedings of National Conference of Social Work, 1920.*

When the Health Officer Is "Overpaid"—Some people, according to *Health News*, New York State Dept. of Health, argue that health officers do too little to earn their salaries:

. . . The trouble is that local officials, usually town supervisors, who start these movements have no idea what their health officers are doing. This is largely the fault of the health officers themselves. If every health officer would regularly make to his local officials an *interesting and readable* report and publish the report, or an *interesting* summary in a local paper, it would do much to put an end to such movements.

"Health Education in an American City"—This is not a review of the new book by Louise Franklin Bache. That function will be fulfilled in due season in the regular book review section of the *Journal*. This is merely an appreciation of what the book is, and an attempt at describing what the book is not.

* Please address questions, samples of printed matter, criticism of anything which appears herein, etc., to Evert G. Routzahn, 130 East 22d St., New York, N. Y.

We have long needed a book of this type—a review of what an effective health department actually has done, directly and in coöperation with other local agencies. We wish that the book could have been larger, so as to cover in equal detail the individual health education activities of the various coöperating health and other agencies in Syracuse. There is a place on the bookshelf for that sort of book.

This book is not a manual on health education, but it has some of the valuable characteristics of such a volume. It tells of activities carried on and materials prepared and used. In recording all this nearly every page gives some glimpse of why something was done, why it seemed to be successful, why it failed or was unsatisfactory.

How could so much be done in 5 years, so much of such a degree of excellence? The answer is easy. There was the sympathetic sponsorship of the Milbank Fund and the State Charities Aid Association; an enlightened health department policy,

and an understanding health officer; a generous, but not lavish, budget; an unusually equipped director of health education, and an exceptional team of specialists on the department staff, and the staff of the local public health association. Has any other city had such a team working under such favorable conditions?

In *A City Set On A Hill*, Professor Winslow tells how important is the adequately prepared director of health education. The yearly budget varied from \$11,477 to \$13,378, or as stated by Professor Winslow,

5.4 cents per capita, which is to be compared with a standard expenditure of 4.0-6.5 cents.

The largest item on the bureau budget was the salary of the bureau director. That was as it should be. The book bears unconscious testimony to the economy in paying for personal ability. For example, the active enlistment of literally hundreds in various projects was largely due to the resourcefulness and energy of the director.

Here, as in *A City Set On A Hill*, we note the lack of a program of health education, such as was discussed in the *Journal*, May and June, 1929, and, as was stated briefly in this department a month ago:

A program or a plan for health education, as we see it, is not the planning of the details of a particular project or event. Rather we are thinking of a plan or program for a year or other extended period. It is the selection of the objectives and the chief audiences and mediums mapped out in relation to the needs of the community and the resources of the health agency, or the group of health agencies.

There were programs, in the plural, the stressing of special themes, much planning. But there was too little time in Syracuse for the development of an underlying, inclusive program or the formulation of a philosophy of health education out of which such a program would have emerged. One might ask even if too much was undertaken, and

if the supervisory groups thought of health education largely as a succession of methods and materials to be manipulated with energy and varied skills.

Every public health worker concerned with the organization of health education will wish to read *Health Education in an American City*, by Louise Franklin Bache. Published for the Milbank Memorial Fund by Doubleday, Doran and Company, New York, N. Y. \$2.00. For sale by the A.P.H.A. Book Service.

Czechoslovak Republic Wishes to Hear from You—We hope that many readers will respond to this and other requests from outside of United States and Canada which we publish now and then. Please send samples of various types of health education and publicity.

We take very much interest in the field of public health education and would be glad if it is possible to send us some of the new issues on health education. The member of our staff, Mrs. Dr. Klimova-Fugnerova has been studying health education during the year 1932 and profited greatly by it. We try to do our best in this field even in these unfavorable conditions, and think the material of U.S.A. may be of great use to us.

From Dr. L. Votava, Chief of the Health Education Department, State Institute of Public Hygiene of the Czechoslovak Republic, Praha XII, Korunni Tr. 162.

"Propaganda in an Economy Programme"—Under this heading are reported addresses before the annual meeting of the National Baby Week Council. Several paragraphs seem to be equally significant in Canada, the United States, and elsewhere:

Reduced means are teaching us at least one valuable lesson—the lesson that expensive propaganda is not always the best propaganda. This should be a cheering reflection for many a committee whose depleted funds, so far from meeting a publicity bill, will scarcely cover running expenses.

. . . The critical financial situation was

itself a vital reason why health propaganda should not be relaxed. It was at present the duty of propagandists to safeguard from reduction the relatively insignificant amount at present devoted to public health work. This could be done by creating a strong public opinion on the necessity for health work.

. . . No forms of propaganda bore more immediate fruit than public health education. Speaking generally, the health services of this country were highly organized. The publicity problem of the day was to persuade the public to take full advantage of those services.

. . . It was perhaps not altogether unfortunate that, faced with the necessity of maintaining good publicity with very little money, we were forced to examine the old methods, to decide which had proved themselves effective, and which had become obsolete.

. . . I have found poster methods too expensive, but there are plenty of other methods of making the work known to the public. If you have a Baby Week, do it on a big scale, with a procession right through the town! If you are opening a clinic, treat it as an important event, and invite all the prominent people in the town to be present.—

Mother and Child, 5 Tavistock Square, London, W. C. 1. April, 1933. *9d*.

Health Education in Arizona—The State Board of Health has announced that

A Division of Health Education, state-wide in its scope, has been organized for the purpose of carrying out a comprehensive program of visual education in public and personal health matters. Coöperation of several agencies, including the U. S. Public Health Service, The Rockefeller Foundation, the University of Arizona, Extension Division, and the Metropolitan Life Insurance Company, has been secured for this state-wide program. The program is to be carried out by the use of motion pictures which will be exhibited in schools, before Parent and Teachers Associations, woman's clubs and other organizations or agencies interested in promotion of public health and welfare throughout the state.

The department has obtained complete motion picture equipment for this project, including projection machine and screen which may be used wherever electricity is available. Arrangements will be made to exhibit these motion pictures in any school in the state or before any organization interested in the subjects to which they pertain upon written request.

"In Conference"—"How Effective Is Health Education?" will be presented at the annual meeting of the National Tuberculosis Association, Cincinnati, May 16. Speakers: Mrs. Ruth Heavenridge, Indianapolis; Dr. John Sundwall, Ann Arbor; Mary P. Connolly, Detroit.

The Division on Educational Publicity, under the chairmanship of E. C. Lindeman, and Social Work Publicity Council will hold a number of sessions in connection with the annual meeting of National Conference of Social Work, Kansas City, May 20-26, 1934.

Dr. H. E. Kleinschmidt will conduct a publicity clinic at the biennial meeting of the National Organization for Public Health Nursing, Washington, April 25.

Mary Swain Routzahn led a round table on "Publicity and Annual Reports" at a regional conference of American Assn. of Hospital Social Workers.

Palestine Will Welcome Your Material—Reprints, copies of journals, and other printed material would be welcomed by editors of—

The health, medical and hygiene journals issued in Palestine.

The Jewish National and University Library has a large medical department and is also interested in receiving health, hygiene, and medical periodicals. This department is of great service to the physicians and medical scientists of the country.

Kindly address to K. L. Meltzer, Hebrew University, P.O.B. 340, Jerusalem, Palestine.

We hope that this and similar requests will be answered from the many countries represented among our readers.

Information Wanted—What have you or what would you suggest?

. . . any material on Health Education. I am interested in health programs in general,

but particularly in health measures, programs, outlines, etc., in the outpatient departments—which may include various clinics.—Edna Mae Barrios, R.N., Vanderbilt University, Nashville, Tenn.

. . . samples of literature suitable for me to use in my work as dental hygienist in a public school.—Ruth Neighly, H. W. Gillett Dental Clinic, Glen Cove, N. Y.

Hygeia for March, 1934—*Hygeia*, American Medical Assn., 525 No. Dearborn St., Chicago, Ill. (25 cents), contains:

Plumbing and health (based on Chicago outbreak); Facts and fallacies of cosmetic surgery; Does your nose know? Full speed ahead kills (modern rush); The child who stutters; What shall a man believe? (advertising); Cancer—its status today; Massage; Keeping the underweight child in school; Committee acceptance of whole wheat flours; Building for posture; Cold feet; Sex in middle and advanced life; Helping baby to grow up; Training for golf and competitive swimming; Modern voodooism; What happens when you move; "School and Health," with organizing for good team work, how home and school can work together, new health books for teachers and pupils; New books on health; Questions and answers.

"Yellow Jack" in New York City—The heroic tale of the struggle of man versus "yellow jack" is told dramatically in a moving and significant play by Sidney Howard. It is based on a chapter of Paul de Kruif's *Microbe Hunters*, and is now being shown at the Martin Beck Theatre, in New York.

Yellow fever epidemics have inspired other writers before. The story of "The Flying Dutchman," the subject of an opera by Wagner, tells of a ship stricken with this scourge. A description of an outbreak of yellow fever among the crew of a ship is also given in Coleridge's *Ancient Mariner*. But all this was before Walter Reed and his coworkers, Drs. Carroll, Lazier, and Agramonte, as a result of their investigations carried on in Cuba in 1900–1902, proved that yellow fever is transmitted by the bite of infected

mosquitoes, and in no other way; and long before the second chapter of yellow fever began in 1927 with the discovery by Stokes and his coworkers that Asiatic monkeys were susceptible to yellow fever and might be used as experimental animals; and even longer before the recent discovery of a special vaccine.

Sidney Howard begins his play at the end, presumably with the idea in mind that the modern knowledge of the cause of yellow fever will give new meaning to this dramatic triumph of man over yellow jack. But his intermissionless play deals mainly with Reed and those other brave men who volunteered to face the dreaded experiment of being bitten by infected mosquitoes.

It is worth seeing, this play on the conquest of science and the willingness of men to give their lives to the dreaded yellow jack, in the cause of humanity. It is a play of great importance, especially for social and public health workers (notwithstanding that at least one of Howard's buck privates volunteering for the experiment verges on caricature). You would not want to miss it.—Savel Zimand.

Dates Ahead—Through the year national and local events offer opportunities for the department, the association or the council to take the lead, to participate, or to be recognized. Doubtless some overlapping of dates and of interests will be settled in individual communities.

"Negro Health Week" is about over as this issue of the *Journal* appears.

April—"Early Diagnosis Campaign—Health Recovery Campaign" sponsored by tuberculosis associations.

April 28–May 5—"Youth Week" (formerly "Boys' Week"). Address: National Youth Week Committee, 211 W. Wacker Drive, Chicago, Ill. Tuesday, May 1, is "Health Day."

May 1—"May Day" or "Child Health Day." Address: American Child Health Assn., 50 West 50th St., New York, N. Y.

May 13—"Mothers' Day." Address: Maternity Center Assn., 1 East 57th St., New York, N. Y.

May 7—"Jubilee of Organized Camping." Address: Community Chests and Councils, Graybar Bldg., New York, N. Y. An opportunity for local groups to stress the values of organized camping.

"The Dominion is Preparing for Celebration of Several Important Anniversaries" reads a headline over a mention of commemorations of 100 to 400 year old events. We hope to hear that Canadian health workers are planning to show health progress and changes in health conditions in connection with the celebrations.

Early Diagnosis in 1934 — The February *Journal* had several pages about this campaign, sponsored by tuberculosis associations, and offering a significant opportunity for all types of health agencies to participate in making a real impression upon the community.

A usable range of printed matter, other help and plan suggestions have been prepared.

Get in touch with local, state or national tuberculosis associations.

"Mother's Day," May 13, 1934—This year "a planned economy of mother's lives" is proposed as the objective of Mother's Day celebrations. This is achieved by means of

. . . a country-wide effort to appraise the maternal facilities of each community. This is to be done by women's clubs, and men's clubs coöperating with local obstetricians, hospital executives, and medical societies. Local surveys are to be made using a blank appraisal form which the Association provides free. After such an appraisal, it will be seen more clearly just what is needed to effect improvement.

Every local club or group sending in a form will receive, without charge, a copy of the *Maternity Handbook*, by Anne A.

Stevens. The three clubs submitting the best appraisals will get a complete maternity display equipment, which may be used to teach maternity hygiene to mothers. The contest closes May 1, just in time so announcement of winners may be made by Mother's Day.

For men's clubs there is provided a suggested program for a meeting to be held the week just before Mother's Day. Publicity material in the form of ideas and suggestions for use with local newspapers and radio stations, will be sent to any local group on request.

Kiwanis International has sent to its 2,600 clubs a statement about Mother's Day. Rotary and Lions Internationals are expected to do likewise.

Address Maternity Center Assn., 1 East 57th St., New York, N. Y. for full information. A new 4-color poster, 14 x 22 inches, is sold at 10 cents.

Health Education in the Schools—The following references appeared in *Library Index*, National Health Council, 50 West 50th St., New York, N. Y.

Mrs. Barclay learns about diphtheria prevention, by Marie Dandridge. *Public Health Nursing* (New York City) 26:39-40, Jan., 1934.

Teaching food appreciation, by I. A. Mercer. *Journal of Health and Physical Education* (Ann Arbor, Mich.) 5:26-27, Jan., 1934.

The nurse and the classroom health program. *Public Health Nursing* (New York City) 26:50-51, Jan., 1934. The second topic in the Study program for school nurses.

The teaching of health education in elementary schools, by W. W. Patty, Ph.D. *Journal of Health and Physical Education* (Ann Arbor, Mich.) 5:3-7, Jan., 1934.

Lay dental health education, by G. H. Wandel, D.D.S. *Journal of the American Dental Association* (Chicago) 21:170-80, Jan., 1934.

Psychological by-products of health education, by Ruth Brickner. *Child Study* (New York City) 11:135-37, Feb., 1934.

Well balanced health training, by H. N. Bundesen. *Child Study* (New York City) 11:138-39, Feb., 1934.

Health education in the junior high schools, by E. K. Morrison. *Public Health Nursing* (New York City) 26:94-96, Feb., 1934.

When home and school coöperate, by A. M. Phelan. *Child Study* (New York City) 11:141-43, Feb., 1934.

Adult attitudes and health education, by B. B. Robinson. *Child Study* (New York City) 11:139-41, Feb., 1934.

What the superintendent expects of the health and physical education teacher, by N. G. Engelhardt. *Journal of Health and Physical Education* (Ann Arbor) 5:3-6, 56, Feb., 1934.

Outcomes of health education: I. Knowledge. II. Habits and skills. III. Attitudes, by W. W. Patty, Ph.D. *Journal of Health and Physical Education* (Ann Arbor) 5:34-37, 62, Feb., 1934.

Correlation between physical and health education and the school medical inspection service, by W. S. Cornell, M.D. *Mind and Body* (New Ulm, Minn.) 40:200-5, Dec.-Jan., 1933-1934.

School and health, a department conducted by J. Mace Andress, Ph.D. *Hygeia* (Chicago) 12:167, Feb., 1934. Hitting the nail on the head—School health days that count.

Solving health educational problems. *Hygeia* (Chicago) 12:167-70, Feb., 1934. Schoolroom conditions and practical health education programs, by R. J. Schmoyer.—Organizing objectives in safety education, by H. J. Stack.—Health education aims for rural schools, by R. E. Grout.

Organization for health instruction in public schools, by J. F. Williams and C. L. Brownell. *Teachers College Record* (New York City) 35:269-70, Jan., 1934.

Planning and exhibit, by Pearl Turner. *Public Health*, Michigan Dept. of Health (Lansing) 22:29-32, Feb., 1934. The fourth of a series of articles on visual education.

Education and Prevention in New Jersey—Governor A. Harry Moore in his annual message to the 1934 Legislature:

The one important lesson in this field to be learned from the experiences of the last 4 years, it seems to me, is the necessity for some shifting of our emphasis in the attack upon this whole health and welfare problem. For many years past we have used the greater part of our energy and most of our expenditures in treatment and attempting to correct health and dependency conditions which ought never to have occurred, and we have given entirely too little attention to the preventive side of our public health work. Our institutional population has shown a steady and continued growth year after year, and, notwithstanding the extension of existing institutions and the construction of new ones, practically every state and county institution

for the custodial care of public wards is crowded to the doors and waiting lists continue to grow.

We must attack this problem at its source and this means the substitution of prevention to the greatest possible extent for care and cure. This also means a more determined attack upon disease, insanitation and unwholesome social conditions, more and better public health work, more and better clinics, more and better probation and parole work, more general health education, and, I trust, fewer persons in public institutions maintained at large annual cost when the greatest possible economy is practised. In the proportion that more funds are devoted wisely to preventive health work we may expect to save an increased amount at the custodial end.

RADIO

Next month we would like to pass over Illinois, Connecticut, and Baltimore, and give some glimpses of broadcasting by other state and local groups. We now receive mimeographed radio talks only from the three named above.

Baltimore Health Department:

Highlights in public health, temper tantrums, the lowly germ, rabbit fever, what is indigestion? check your health, eczema, keeping well in 1934, the longest war in history (tuberculosis), watch your weight, measles is here, baby teeth may need filling too, Mrs. Barclay learns about diphtheria prevention (dialogue).

Connecticut State Department of Health, Hartford:

New mental hazards, have you proof that you were born? the community X-rays its children, the public health nurse and tuberculosis program, odors and tastes in water.

Illinois State Department of Health, Springfield:

Diet and head colds in children, more about common colds, bone button infection in industry, the hide and hair industrial menace (anthrax), lead poisoning in industry and its prevention, phases of physical fitness in industry today, health heroes and public health, Dr. Banting and public health aids, Edward Jenner and vaccination, pure food laws and public health, what noise may do to public health, the challenge of pneumonia, anatomy and cell structure exhibits, one hundred years of Pasteur, economics of clean streams and sanitation, the woman who was ministering angel (Florence Nightingale), the story of inoculation, sewage treatment—an essential to

modern civilization, from sorcery to science, when healers were gods, one man's work in life saving (Dr. Park), accidental discovery in medicine and the part played by the layman.

Health plays are broadcast Mondays at 3:15 p.m., E.S.T., by New York State Dept. of Health over station WGY.

SOME TITLES

Do these suggest timely topics, or new slants on old material?

"Smallpox Visits You in the Person of Miss X"; "Upsetting Some Popular Beliefs Concerning Sleep"—Iowa State Dept. of Health, Des Moines.

"To Recent Arrivals" (to the newborn baby about registration); "Like a Forest Fire" ("catching" diseases)—Maryland State Dept. of Health, Baltimore.

HONORABLE MENTION

To Health Dept., Palo Alto, Calif.: for table of contents, an organization chart, an "Education and Publicity" section, and a diagram of city budget appropriations showing amount, percentage and per capita (health of course being the lowest).

MAGAZINE ARTICLES

"The Common Cold," by C. H. Gellenthien, M.D. *Kiwanis Magazine*, 520 N. Michigan Ave., Chicago, Ill. March, 1934. 15 cents.

"Disease Germs Often Swallowed With Our Meals" was a full-page, half pictures, half text, in *American Weekly*. Feb. 4, 1934. This is the Sunday magazine used by Hearst newspapers, the most widely circulated periodical in the United States. The article emphasized the message of the Committee for the Study and Promotion of the Sanitary Dispensing of Foods and Drinks.

"How Much Do You Weigh?" by L. I. Dublin. *American Magazine*, Springfield, Ohio. March, 1934. 25 cents. If over or under, "he tells what

bearing that answer has on your probable length of life."

NEW

Also new to us is *Arizona Public Health News*, State Board of Health, Phoenix. The Feb., 1934, issue was the 96th.

REPORTING

"Inventory for 1933," is a reporting of social hygiene work by state and local departments, associations and committees, and the United States governmental program for control of the venereal diseases, with a directory. 75 pages. *Journal of Social Hygiene*, 50 West 50th St., New York, N. Y. 35 cents.

Again the annual report of the health officer, Middletown, N. Y., "looks interesting." The 15 mimeographed pages are like no other mimeographed production we have seen. It is something to send for by the department or other health agency wishing to get its annual report read by a goodly proportion of the so-called "general public" and at a low cost. Here are two quotations:

It is difficult for people to understand why present methods of communicable disease control differ so widely from those in vogue short years ago. Does it seem strange to you that we do not close schools during outbreaks and that we placard fewer and fewer of these diseases?

We are not proud of our department's tuberculosis program for 1933. The control of tuberculosis is largely a nursing problem. It is obvious, however, that one nurse doing generalized public health in a city of 18,000 cannot devote the necessary time to it. With extra nursing service starting December 7, 1933, thanks to the C.W.A., we hope to do more intensive follow-up.

EDUCATION AND REFERENCE

"The Family Food Supply: What to Buy and Why." 23 pages. Metropolitan Life Insurance Co. Free.

"The Nature of Bacteria," by C. E.

Turner and Ellen L. Lytle. A suggested teaching plan based upon an experimental teaching project. 38 pages. Metropolitan Life Insurance Co. *Free*.

"Diets at Four Levels of Nutritive Content and Cost," by Stiebling and Ward. 59 pages. "Presents diets at four levels and includes information on certain aspects of food purchasing." Supt. of Documents, Washington, D. C. 5 cents. Probably *free* upon request to Bureau of Home Economics, Dept. of Agriculture, Washington, D. C.

"The Effect of Milk on Sleep" is a memorandum summarizing studies on this subject. National Dairy Council, Chicago. *Free*.

"The Psychology of Progressive Deafness," by G. Berry, M.D. Reprint from *Journal*, A.M.A. American Medical Assn., 535 N. Dearborn St., Chicago, Ill. 12 pages. 10 cents; 10 copies, 50 cents; lower rates for more. Send a copy to the chief editorial writer of the newspaper having the most thoughtful editorial page.

"The Economic Aspects of Medical Care," is a revised list of reading references. Julius Rosenwald Fund, 4901 Ellis Ave., Chicago, Ill. *Free*.

"English Workmen Pay Their Hospital Bills," by M. M. Davis. Reprint from *Modern Hospital*. Julius Rosenwald Fund. *Free*.

"A Picture-Book About the Costs of Medical Care." 16 pages, largely picture diagrams. Julius Rosenwald Fund. *Free*.

Reprints from *Public Health Nursing*, 50 West 50th St., New York, N. Y. 10 cents each:

"Planning for 1934: Supervision." 2 pages.

"Treatments in School." 2 pages.

"The Rôle of the Public Health Nurse in Communicable Disease Control." 9 pages.

The following reprints from *Sight-Saving Review* are offered by Natl. So-

ciety for the Prevention of Blindness, 50 West 50th St., New York, N. Y.:

"Home Treatment of the Eyes," by W. L. Benedict, M.D., 5 pages. 10 cents.

"Routine Wassermann Test for All Expectant Mothers," by E. L. Keyes, M.D. 4 pages. 5 cents.

"The Eyes in Infancy and Childhood," by E. L. Coolidge, M.D. 3 pages. 5 cents.

"Why Wear Glasses," by P. A. Halper, M.D. 6 pages. 10 cents.

"Conserving the Sight of Myopic Children," by A. L. Brown, M.D. 4 pages. 5 cents.

"Eyesight in Mental and Physical Development," by A. R. Wilkinson, M.D. 7 pages. 10 cents.

"Contact Glasses," by W. S. Knighton, M.D. 6 pages. 10 cents.

A report of the Committee on the (proposed) American Museum of Hygiene appears in the A.P.H.A. *Year Book*, 1933-1934, page 54.

"Questionnaire Outline for Discussion Course on Welfare Resources." A study outline prepared by Assn. of Junior Leagues of America and distributed by Community Chests and Councils, Inc., 1810 Graybar Bldg., New York, N. Y. 19 pages. Questions as to conditions, possibilities, standards—all in their local application. "Health Problems," 4 pages, covers state and local boards of health, board of education, hospitals, clinics, dental clinics, public health nursing—but not other types of voluntary health work. *Free*.

"Publications and Memoranda," a new list of helps on publicity issued by Social Work Publicity Council, 130 East 22d St., New York, N. Y. Includes health education and helps for those doing health education.

The A.P.H.A. *Year Book*, 1933-1934, may well be studied for the declarations and various reports as desirable background material.

Well nigh indispensable is *Library Index*, edited by National Health Library of National Health Council, 50 West 50th St., New York, N. Y., at

\$2.50 for the weekly issues. Makes available much of the most useful of current periodical references touching nearly the whole range of public health topics.

THE INCOMING TRAY

The "Home of the North Carolina State Department of Health" is pictured on the cover page of *Health Bulletin* of the State Board of Health, with this caption:

Readers of *The Bulletin* are again invited to visit the offices of the State Board of Health at any time while in Raleigh. School teachers accompanying children to Raleigh should include the Health Department in their list of places to be visited.

Birmingham's Health, Jefferson County Board of Health, Birmingham, Ala., Feb., 1934, devotes most of its space with effective text and diagrams, to emphasizing this statement which appears on the cover:

Of all the cities in America, large and small, rich and poor, North and South, only two have destroyed their public health organizations as has Birmingham.

In "Public Health Education," D. V. Curry, M.D., describes his effective use, as medical officer of health, St. Catharines, Ont., of displays in empty stores. *Health Officers' World*, 2912 N. Hackett Ave., Milwaukee, Wis. 20 cents.

Illinois Health Messenger, Illinois State Dept. of Health, Springfield, appears for 1933 in a cloth bound volume with a rather full index.

The *Rochester Democrat and Chronicle* gave a good full-page to the Monroe County and Health Assn., Rochester, headed "Health Seals Spread Christmas Cheer." A variety of pictures occupied much of the page which, happily, cut down the amount of text.

The *New York Times*, Feb. 25, 1934, carried a 3-column wide picture of a

healthmobile used by Los Angeles. "Bringing Health to the Back Country . . . Covers the Remote Sections of the 1,094 Square Miles of the School District" . . . said the caption.

"Multigraphed and bound in the Milwaukee Health Department" was an attractive "Manual of Procedure and Guide for Coöperating Committees in Organizing Preschool Clinics." Excellent use has been made of the display type available for the multigraph; 6 by 9 inches; 16 leaves, plus stiff cover with a pleasing marbled finish; blank pages for "Notes" opposite every text page. If you have a multigraph you will wish to see this example of publication possibilities. 5 cents.

"Health and Baby Weeks in Ceylon," by J. H. DeSaram, in *Mother and Child*, 5 Tavistock Square, London, W.C.1. (Oct., 1933, 9d.), reports that

Health and Baby Weeks are now recognized both by medical officers of health and local authorities in Ceylon as effective means of educating the people in health matters.

The chief method adopted for interesting the public in this week at Dondra was by word of mouth through the schools and headmen, but the traditional method of the beating of the tom-tom and the distribution of posters and hand-bills was also employed. In connection with the clean-up day which preceded the demonstration, a special leaflet was issued. This drew the reader's attention to ten of the main health habits. A novel competition introduced at the Dondra exhibition consisted of a headman's test in elementary health knowledge.

We feel that someone should apologize for the amount of space in this department taken up by long, cumbersome titles of health agencies. And the newest of organizations has the longest and the most formidable of names! "There should be a law!" Really such names do handicap health organizations and limit their speaking and writing use.

BOOKS AND REPORTS

The Dynamics of Therapy in a Controlled Relationship — *By Jessie Taft.* New York: Macmillan, 1933. 296 pp. Price, \$2.50.

The therapeutic value for children resulting from the relationship between therapist and patient deserves the consideration of those interested in the behavior of children. This book gives the records of two such situations: (1) "An Experiment in a Therapeutically Limited Relationship with a Seven-Year-Old Girl," reprinted from the *Psychoanalytic Review*; (2) "Thirty-one Contacts With a Seven-Year-Old Boy as Preparation for Placement in a Foster Home."

In these accounts of the 16 and 31 hours spent, respectively, with these children over a period of weeks, the author gives in detail an accurate account picture of the relationship between herself and the patients. Her account of each child's reaction is not a description of what happened, but rather a verbal expression of the dynamics of the child's personality. The influence of the transference or analytic situation becomes apparent.

There is also a chapter on "The Time Element in Therapy," which is of value particularly to those who in clinic have to make the most of each hour with a patient. In the conclusion entitled "The Forces That Make for Therapy," are set forth some ideas regarding the reasons for life's failures and the sources and means of relationship therapy. The author adheres to many ideas given by Otto Rank.

The book has merit in weighing the possibilities of offering psychotherapy to individuals, either by social case work or by physicians. Dr. Taft does

not jump to any preconceived conclusions but honestly records what she noted. The book is well worth reading.

ELIZABETH I. ADAMSON

Food-Borne Infections and Intoxications—*By Fred Wilbur Tanner.* Champaign, Ill.: Twin City Printing Co., 1933. 450 pp. Price, \$5.50.

The author treats of a subject which has been much before the public for some years. He believes that the acceptance of ptomaines as causes of illnesses has retarded work along sound lines and calls attention to the fact that heat-stable gastrointestinal irritants formed by members of the staphylococcus and Salmonella groups furnish better explanations for food poisoning.

There is an introduction treating of the subject in general, followed by one on the hygiene of food, cooking, handling, etc. We are glad to note that he lays stress on the medical examination of food handlers. Insect carriers and other vectors are considered. The special types of infections are taken up under the heads of the groups of organisms which cause them. Extensive tables and accounts of a large number of reported outbreaks are given. The book contains a great amount of valuable material which will be useful for reference.

The printing and make-up are good.

MAZÛCK P. RAVENEL

Alcohol. Its Effects on Man—*By Haven Emerson, M.D.* New York: Appleton-Century, 1934. 114 pp. Price, \$1.00.

This is an excellent presentation, written for school teachers, high school and college students, of the subject em-

braced in the title. The book has been practically summarized in the 15 points enumerated in the preface concerning which there is agreement among those qualified to judge. The subject matter of the book is largely made up of matter going into more detail to prove the points mentioned. There is one inconsistency which may be mentioned. On page 105, the author quotes Sir Arthur Newsholme, well known as an extreme dry, as showing that 1 per cent of the adult males in England each year get drunk, in the official police sense, while 1 in 200 is legally convicted of public drunkenness. He goes on to say that crimes of physical violence with or without drunkenness are greater where the per capita alcohol consumption is high. The report of Baron Trenchard for 1932, just issued, shows that there were only 21 murders during that year in London, and up to approximately the middle of February, 1934, not a single murder has occurred.

The book is well written and contains many valuable facts. It ends by giving a list of 12 authoritative sources of information which have been consulted. Unfortunately, it has a jacket with the usual amount of blurb to which publishers seem addicted.

MAZÏCK P. RAVENEL

Diet and Personality—By L. Jean Bogert, Ph.D. New York: Macmillan, 1934. 223 pp. Price, \$2.00.

The title of this book will undoubtedly attract the attention of the "average man and woman" for whom it is admittedly written. The same average man and woman will find it easy, interesting reading, and concrete information may be obtained, but one seriously doubts the final effect upon personality.

An introduction by Dr. Mendel points out the "food conscious" attitude of the American public and recommends the fitting of diet to type.

The book is made up of 15 chapters

with the first 3 devoted respectively to the diet problem of the slender person, the stocky person and the person of medium build, which classification seems all inclusive. Then follow rather generalized discussions of such enemies to satisfactory living as nervous strain, city perils, lack of exercise, improper posture, indigestion, constipation, underweight. Good and bad health habits are listed and there are specific "Do's" and "Don'ts." Throughout these chapters, there are many references to the endocrine rôle in body types and the possibilities of diet in resulting conditions. A chapter on Reducing Diets suggests menus and foods suitable for the reducing-conscious reader.

The book is written in a popular, rather breezy style. It contains much informative material regarding general living conditions and health habits and diet.

It is printed on good paper in a type that will make it good reading for the general public.

ANNA DEAN DULANEY

Chronic Illness in New York City—By Mary C. Jarrett. Foreword by Dr. Ernst P. Boas. 1933. Published for the Welfare Council of New York City by the Columbia University Press. 2 vols.—Vol. 1, *Problems of Chronic Illness*, 258 pp.; Vol. 2, *The Care of the Chronic Sick by the Different Types of Voluntary Agencies*, 287 pp. Price for 2 volumes, \$5.00.

These two volumes represent, as Dr. Boas writes in the Foreword, "the first carefully considered review and interpretation of the many aspects of the problem of chronic disease, grounded on an adequate factual basis." The study describes critically the findings of a survey of the chronically ill and the facilities for their care in New York City; and suggests "a plan for an

orderly advance toward the prevention and care of chronic illness."

Miss Jarrett's work is a challenge to public health authorities. For, as Dr. Boas states, while the public health program has, during the last 50 years, gradually broadened its scope, "the social significance of chronic illnesses, which today are the chief causes of invalidity and death, have been largely ignored." This, notwithstanding the fact that for many years there has been an increasing demand for improvement of the chronic sick on the part of organized groups, physicians, nurses, and social workers. This study is best evidence of this demand. But so far only a beginning has been made in a few places.

To awaken the community to its responsibilities on this problem and to furnish accurate information in this field, the Research Committee of the Welfare Council of New York City has performed the very valuable service of carrying on a census of chronic illness in New York City, on which data Miss Jarrett based the report.

The census of the Welfare Council included all chronically ill persons under the care of medical and social agencies in New York City. Institutional agencies reported 56 per cent, and non-institutional agencies 44 per cent of the whole number. Nearly 21,000 cases were recorded, yielding a ratio of the dependent chronically ill, exclusive of those suffering from tuberculosis and mental diseases, to the general population of 1 in 310. It is estimated that this represents only one-third of the chronically ill in the entire city. In other words, approximately about 1 per cent of the population is disabled by chronic diseases.

The two most common misconceptions concerning chronic illness are, first, that it is always incurable; and second, that it affects chiefly the aged. Miss Jarrett's study points out that the

outlook for recovery from illness was favorable in one-fourth of the children and in one-tenth of the adults under 60 years of age. Regarding the second misconception, her study shows that nearly half of the chronically ill persons in the census were under 40 years of age; about one-third were under 16, chiefly children with orthopedic disorders, and nearly one-fourth of these children were under the age of 6; and only one-fifth of the whole number were over the age of 70. Moreover, the majority of patients were ambulant, only 30 per cent of the adults and 15 per cent of the children being confined to bed or to wheelchairs. Thus "chronic disease affects persons of all ages, and may occur at any time from the beginning to the end of life."

The control of mortality among infants and the prevention of deaths from tuberculosis, diphtheria, and other infectious diseases, have been and still are in the forefront of the public health program. But deaths from these diseases have been greatly reduced, and the major causes of present-day mortality center around the group of diseases affecting the heart, blood vessels and kidneys, cancer, pneumonias, and accidents. This shift is bringing about an increasing recognition of a change in the objectives of the public health program so that it be realigned to correspond with present conditions.

Miss Jarrett sets forth the essentials of a community program for dealing with chronic illness, and stresses the necessity for creating public recognition that prevention of chronic disease is the most pressing public health problem today. The rôle that departments of health should play in this new program, as well as the function of the voluntary agencies and how they can participate in the care of the chronic sick, are carefully examined by the author.

This study is an indispensable guide to those seeking accurate information

in the field of chronic diseases. It is only to be regretted that such excellent and authoritative source books should lack an index.

SAVEL ZIMAND

Heredity and Environment—By Gladys C. Schwesinger. New York: Macmillan, 1933. 484 pp. Price, \$4.00.

Heredity and Environment will either be considered an elementary revamping of three or four standard works, or a profound study "in the genesis of psychological characteristics," depending upon whether one is or is not familiar with the literature of psychological testing and personality measurement. Not that it is not a very useful book to one in either category—on the contrary, even the student of the field will find it a convenient summary of Pintner's *Intelligence Testing*, Symonds's *Diagnosing Personality and Character*, Hollingworth's *Vocational Psychology and Character Analysis*, and the *Twenty-seventh Year Book of the National Society for the Study of Education*, all brought up to date by the careful editing of last year's *Psychological Abstracts*.

It is an excellent textbook for courses in psychological measurement, for it is, in the main, an elaborate survey of the I.Q., its measurement, and the factors that influence it; but it is hardly, except in one portion, an adequate treatment of heredity and environment.

Why a study in genetics should devote almost two-thirds of its pages to listing measures of intelligence and personality and to summarizing superficially the viewpoints of the major schools of thought on what constitutes personality, and only about one-third (one of six chapters) to the subject of the book as indicated in the title, is difficult to see. It really consists of three distinct uncoordinated parts, and if each of these sections were published

separately, only praise for the author would be in order, for two of them would be compact summaries of (1) the field of intelligence and personality measurement, and (2) the variety of viewpoints on intelligence, while the third would be a monograph on recent studies of the effects of various environmental factors on the I.Q.

On the whole, the book is a very scholarly work, but it is unfortunate that three distinct unrelated studies were bound between two covers ostensibly as one study. Each portion serves a useful purpose, but only one serves the purpose of the book. Evidence of painstaking work abounds throughout, and specific references are so numerous that reading is sometimes made difficult; more than 800 references are included in bibliographies listed after each major chapter.

MORRIS KRUGMAN

Good Eyes for Life—By Olive Grace Henderson and Hugh Grant Rowell, M.D. New York: Appleton-Century, 1933. 202 pp. Price, \$2.00.

This volume is written in a sprightly style throughout; and its catchy phrases and the use of words in unusual meanings pique the curiosity of the reader. The names listed by the authors in their acknowledgments indicate that they had the coöperation of a number of leaders in the fields of ophthalmology and education. The quotations and the frequent references to the findings of scientific research suggest that they also have drawn upon the resources of an excellent scientific library. The well chosen collection of excerpts from scientific writings, even though presented in the Ripley, believe-it-or-not, style, leaves the reader with a sense of having been in touch with the truth.

It is in the interpretation of the facts that the reader is likely to find cause for objection. The presence of positive,

unqualified statements, as yet unsupported by authentic research, weakens the use by the authors of excerpts from scientific papers. Furthermore, flippancy, often in itself misleading, when used as a device to brighten up facts, is disappointing to one seeking information.

The authors are at their best in the material relating to the working or to the reading position for school children. It is regrettable that other sections of the book do not reach the same level, since there is genuine need for a popular presentation of scientific information on eye health. ANETTE M. PHELAN

The Chemistry of Flesh Foods and Their Losses on Cooking—By R. A. McCance and H. L. Shipp. *Medical Research Council, Special Report Series, No. 187. London: His Majesty's Stationery Office, 1933.*

This work was undertaken largely owing to the lack of adequate knowledge of the chemical composition of foods, particularly meats, and because practically all existing analyses were on uncooked foods.

In three parts, there are given a description of the analytical methods employed, results obtained on a number of different kinds of fish, shellfish, meats and poultry, and the cause and extent of losses brought about by different methods of cooking.

The analytical methods are given in such detail that they may be duplicated. The cooking methods are scantily described and some would be hard to duplicate. The degree of "doneness" is one of the most important factors affecting cooking losses, and this can be accurately controlled only by the use of well made meat thermometers and thermocouples. The authors in many cases do not record the temperatures at which the meats were cooked, which is important in affecting the shrinkage. In view of the

fact that carcasses of the same animal vary one from another and that one cut varies from another of the same carcass, it would seem that accurate descriptions of the samples should accompany the analyses; also duplicate or paired cuts from the right and left sides of the same carcasses should be used, one analyzed raw, and the other after cooking.

The study is a valuable contribution to the knowledge of the composition of cooked meats and the effects of cooking.
JESSIE A. CLINE

Nervous Breakdown—By W. Béran Wolfe, M.D. *New York: Farrar & Rinehart, 1933. 240 pp. Price, \$2.50.*

In the judgment of many, this economic depression from which we hope we are emerging is likely to result in—or has already resulted in—an excessive number of nervous breakdowns. Hence the timeliness of a good book dealing with this subject. A discussion of causes and symptoms; a series of case histories; a summing up talk with reader—these are the essence of the book under review.

Two or three short quotations will exemplify the theory on which the author proceeds. "The pattern of any individual's life is a pattern of compensation for the inferiority feeling experienced in childhood." "The strategy of an individual's life is directed toward a goal of security, superiority and well being." He then goes on to assert that failure to make progress toward this goal results in loss of "Face" on the part of the individual, and a nervous breakdown to conceal the true state of affairs. The cure comes about by acquiring a new sense of "Face" based on service to others. A number of actual cases are analyzed to show how this works out in practice. In the course of his discussion the author strays up a side path in a long

but interesting comment on the current economic depression as it affects the inhabitants of the United States. No epithets are spared in characterizing the attitude of the average American in the face of his lost sense of security.

This book, I imagine, may be more useful as a prophylactic than as a cure. The individual whose world has not yet slipped out from under him will find many hints on how to keep a firm footing. The author's style is vigorous and colorful. There seems to be no such word as fail in his vocabulary; his cases are all cures. This, I presume, is for the psychological effect on the depressed patient. The ideal of normality held up for guidance seems to be that of the "good mixer"; or perhaps Ebenezer Scrooge after the ghosts were through with him. The last chapter or two are not so good as the others, tending to dissipate the clearer impression of the body of the book.

All in all, an interesting treatment of a much misunderstood subject.

MERRILL E. CHAMPION

Great Men of Science—A History of Scientific Progress—*By Philipp Lenard. Translated from the Second German Edition by Dr. H. Stafford Hatfield, with a Preface by E. N. da C. Andrade. New York: Macmillan, 1933. 389 pp. Price, \$3.00.*

Although the names of the author of this book and of the writer of the introduction would seem to be sufficient guarantee of the authenticity of the work, the writer of this review has taken the precaution of submitting it to a well known physicist.

While not concerned with public health, it is believed that this book should be in the library of well educated scientific men, whatever their special interests may be. A number of the discoveries of those, sketches of whose lives are here given, have been adapted not only to medical practice,

but to some preventive measures, though none are directly concerned with public health. The articles concern not only those whose names are household words in all educated circles, but the author has rescued from a more or less deep oblivion the names of some who have not attained wide popularity, in spite of their contributions.

The translation seems to be excellent. The book is most readable and the illustrations, consisting almost entirely of photographs, would assure the value of the book, apart from its substance. The printing and make-up are all that could be desired, and the work can be unreservedly recommended.

MAZŮCK P. RAVENEL

Physiological Health—School of Education Series, New York University. *Edited by Jay B. Nash, Chairman, Dept. of Physical Education. New York: Barnes, 1933. 308 pp. Price, \$2.00.*

Physiological Health, the fourth book in a series of five to be published on Interpretations of Physical Education, is divided into 5 parts. Each part consists of a series of papers; effort being made to contribute to the subject from several pertinent viewpoints.

Treatment in a work of this size must necessarily be somewhat brief on many points, but a group of specialists was selected well qualified to discuss the particular topics assigned, all well known in the literature for their contributions along the lines involved in the present volume.

Cross references are given by a number of the specialists. The selected bibliography in health given as Part VII has been carefully compiled and is representative of the different activities which contribute to health.

The book does not have the continuity which would prevail in a book by a single author; on the other hand, it has the merit of presenting the views

of persons who have specialized in the fields which they discuss and in which they are respectively better known than a single writer would be.

This book is within the range of the average intelligent reader and deals with 6 main topics: Health Defined, The Forces and Factors in Building and Maintaining Health, Health as a Basic Potential, Health as a Basic Potential for Full Development, Teaching for Health, and Administration for Health.

C. E. TURNER

Safety in Physical Education in Secondary Schools—*By Frank S. Lloyd. National Bureau of Casualty and Surety Underwriters. New York, 1933. 167 pp. Price, \$1.25.*

This is a report on a study of the types and causes, with suggestions for prevention, of accidents occurring in the physical education program—including gymnasium work, sports, and athletics—in secondary schools.

The larger number of accidents in physical activities in the secondary schools—especially in football—has long been a cause of worry to physical educators and to school administrators.

This study, while showing a high accident rate for football, 8.75 per 1,000 exposures, shows that in proportion to the number participating the accident rate is higher in touch football, 17.11, and heavy apparatus work, 13.68; after football, the next highest rate is in lacrosse, 5.97, followed closely by wrestling, 5.71, and tumbling, 5.15.

Touch football—a supposedly innocuous sport—ranks first. Possibly this is due to the untrained condition of the players and to their lack of protective armor.

In number of days lost from classes—in proportion to number of exposures—heavy apparatus work is most hazardous, 88.0 days lost per 1,000; touch football, 81.52; wrestling, 72.44; and football 64.81.

An excellent summary of conclusions is presented and the report ends with recommendations as to means of accident prevention in this group.

This is an extremely valuable publication, particularly for those responsible for secondary school activities.

C. H. KEENE

The Teaching of Preventive Medicine in Europe—*By Carl Prausnitz. London: Oxford University Press, 1933. 180 pp. Price, \$3.75.*

This volume is made up of the Heath Clark Lectures, 1932, delivered at the London School of Hygiene and Tropical Medicine. It is based largely on personal observations by the author, supplemented by documents of the Health Section of the League of Nations. It is to be regretted that there are no reports from Belgium, Italy, the Netherlands, or the Scandinavian countries, all of which are doing very good work in the teaching of preventive medicine.

The book is a valuable contribution to our knowledge of the subject treated. Perhaps the most interesting chapter is the introduction of some 28 pages, in which are discussions of unemployment, malnutrition, etc., the only objection to which is that the data presented are not quite up-to-date. The author gives an excellent aphorism—"The greenhouse of civilization brings forth not only sweet fruits and beautiful flowers, but also poisonous weeds." He also brings forward an unanswerable argument in his statement that to advance preventive medicine is to the interest of the state, hence it is obvious that the state must do all in its power to stimulate and assist research by founding and maintaining adequate institutions of hygiene. As a fact, all enlightened countries now have such institutes which are being steadily improved and added to. There is a description of the teaching of preventive medicine in the various countries visited by the author,

with a fairly complete outline of what is being done, illustrated by some excellent photographs of buildings, laboratories, and lecture halls.

Practically all of these institutes are under state control and supported by the state, and the great majority of them were erected by aid from the Rockefeller Foundation. The volume ends with a chapter on the work of the League of Nations.

The value of the book would have been much increased for the average reader who has not been able to visit the countries and the institutes mentioned if the author had given a more extensive critical comparison of them.

The book is excellently printed and made up. MAZŸCK P. RAVENEL

Our Common Enemy: Colds—*By the Editors of "Fortune" in Consultation with Eminent Physicians. New York: McBride, 1934. Price, \$1.00.*

Every once in so often a layman breaks into print on a medical subject, and, as a rule, makes a mess of it. This time the editors of *Fortune* have tackled one of the least understood and

most difficult problems in medicine. The only conclusion that can be arrived at from their statements is, what all doctors have been aware of for a long time, that we know very little about the common cold.

The authors claim to have been in consultation with eminent physicians, whom they are very fond of speaking of as "No. 1," so and so. They have left out of consideration entirely perhaps the most monumental work on colds which has yet been published. As editors supposedly interested in good English, the authors should have avoided the use of "flu" for influenza. There is no such word to be found in either English or medical dictionaries.

The really useful part of this book is Part II, "The Cold Business," in which the various nostrums and quackeries are treated in a masterly manner, which ought to be a lesson to the public, though it will not.

The illustrations of germs which are found in colds, following page 47; are worse than useless. The book is well printed and is entertaining.

MAZŸCK P. RAVENEL

REPORTS

New Zealand—The report of the Director-General of Health of New Zealand for the year ended March 31, 1933, indicates progress in health activities as evidenced by declining death, infant mortality and morbidity rates. The 1932 death rate was 8.02 per 1,000 mean population, the lowest ever recorded in New Zealand. The birth rate was 17.09 and the infant mortality rate, 31.22 per 1,000 live births. With the exception of a minor epidemic of acute poliomyelitis (148 cases and 19 deaths), infectious diseases were generally marked by a distinct fall in incidence.

During the past 7 years individual records and histories of all persons treated for cancer in the public hospitals in the Dominion have been maintained by the Census and Statistics Office. There have been nearly 2,000 cases analyzed annually. These data have been published by the Government Statistician in the *Monthly Abstract of Statistics* during 1932. The method of keeping records has been standardized and brought into conformity in the four centers, and a follow-up system for cases which have left the hospital has also been developed.

Special attention has been given to

the question of malnutrition among school children. The conclusions drawn from an analysis of the 60,000 to 70,000 annual examinations over a 6-year period indicate that over the Dominion as a whole the nutrition of school children has been well maintained, although there is some evidence that a group of city children is showing clinical signs of malnutrition due to the economic depression. Measured by mortality and morbidity rates, the economic crisis has not yet shown any serious detrimental effect on the public health, nor has there been any increase in the proportion of in-patients treated in public hospitals.

Nashoba Health District, Mass.—The first annual report of the Nashoba associated boards of health gives a list of members of the board during the past year on the title page. The 14 towns comprising the District have been assisted by the Commonwealth Fund and the State Department of Public Health. Each town has 3 members on the board, which meets 4 times a year in the different towns in alphabetical rotation. The Executive Committee, composed of one member from each local board, meets monthly. The Health Unit is that group of trained personnel hired by and responsible to the Nashoba Associated Boards of Health. Additional services have been established in the control of communicable disease, nursing, laboratory, and sanitation. Records, reports, and vital statistics for the entire area are centralized in the Unit's office.

Professional advancement to physicians and nurses in the district through medical and nursing institutes and through fellowships for post-graduate study at recognized schools is another feature of the newly established program. The immediate effect of these new services developed by the Health Unit is evidenced in the increased rating

of public health activities in the District, as measured by the *Appraisal Form for Rural Health Work*, from 367 points in 1930 to 598 points in 1932, or an increase of 63 per cent.

Madison County Health Unit, Kentucky—The report of this Unit for the fiscal year ending July 1, 1932, indicates that tuberculosis is one of the outstanding causes of death in the county. Consequently a vigorous educational campaign and a systematic canvass of contacts of tuberculosis cases within a 3-year period were undertaken. Every person in the family of an active case was urged to have a physical examination, a tuberculin test, and, if indicated, an X-ray of the lungs.

Three venereal disease clinics were held weekly by the department, where 1,072 people were examined over 12 months, 55 per cent of the patients under supervision being colored. The work of the 19 midwives practising in the county (7 colored and 12 white) was supervised. More than 100 babies were delivered by midwives in 1931.

This is practically a descriptive account of the health department activities, without tabular statistical material, but attractively illustrated by a number of pictures. A noteworthy feature of this Health Unit program is the systematic organization of lay and professional committees.

Gibson County, Tenn.—Gibson County had an estimated population of 47,109 as of January 1, 1933, with 21 per cent of its people colored, and less than 1 per cent foreign born. The county, located in the western part of the state, is essentially agricultural and is said to be the second in the United States in the diversification of crops. There are 8 incorporated towns in the county, with a total population of about 12,000, no town having over 5,000 people according to the 1930 census.

The school enrollment in the 76 white and 31 colored schools is 10,000.

In 1930 the Commonwealth Fund subsidized the health department with the understanding that the county would gradually take over the entire cost of the work. In addition, the Fund has awarded study fellowships to physicians in the county.

Since 1930 the department has doubled its personnel. Approximately 50 per cent of the expectant mothers in the county have been under nursing care during the past 3 years. An attempt is made annually to examine all school children in the 1st, 3rd, 5th, and 7th grades.

The report of 23 pages is interspersed with interesting full-page photographs of various phases of health department activities.

Dayton, Ohio—A summary of health activities during 1933 appears in the January, 1934, bulletin of the health department, and indicates a birth rate of 15.2, a death rate of 11.7 per 1,000 population (9.9 corrected for residence), and an infant mortality rate of 48.8 per 1,000 live births. There were no deaths from typhoid fever or small-

pox. A 60 per cent increase was noted in deaths from tuberculosis "as a result of the depression."

The results of a survey made in 5 schools to determine the amount of undernourishment among relief cases showed that the children of many families not on relief are suffering more from straitened circumstances than are those who are. An anti-diphtheria campaign was undertaken with the result that approximately 1,000 children under 2 years of age have been immunized during the year. In 1933 there were 150 cases and 8 deaths from this disease, as compared with 176 cases and 16 deaths in 1932.

The hope is expressed that in the future the statement that "every physician's private office will become a health center" may be a reality; that immunizations against diphtheria, smallpox, and scarlet fever, as well as general physical examinations, treatment of a majority of the indigent sick, examination of children for school attendance, etc., may be conducted in the offices of private physicians. The city will assist in financing cases where the patient is unable to pay in full for treatment.

ABSTRACTS FROM RECENT FOREIGN SOURCES

CHILD WELFARE PROVISIONS OF THE SOCIAL WELFARE LAW OF 1933 IN DENMARK

Introductory statement—The social-welfare law of Denmark of 1933 is a codification of the social welfare and child welfare laws of that country. Several chapters of this law are devoted to child welfare. While previously the child welfare regulations were scattered in a number of laws and were administered by different bodies, the new law, superseding and amending the previous legislation, has consolidated practically all child welfare measures and has unified their administration.

Administration of the child welfare

provisions—In every commune, except Copenhagen, the child welfare work is to be performed by a social welfare committee (Social Udvalg) through a sub-committee on child welfare (Underudvalg) containing persons who are not necessarily members of the local government, but who must be well qualified for child welfare work. In Copenhagen there is to be a special child welfare board (Børnenaevn). This concentration of all child welfare work in one local body and the emphasis on qualifications rather than

on membership in the local government are innovations in the present law.

The child welfare work of all the communal social welfare committees is supervised by the National Board of Child Welfare (Landsnaevnet for Børneforsorg) consisting of 5 members, one of whom is the Chief Inspector of Child Welfare. The Board also passes final judgment on appeals against the decisions of the communal committees.

The Chief Inspector of Child Welfare, assisted by a number of inspectors, has general charge of child welfare work. Among other things he must inspect personally at least once a year the institutions for children; the inspectors must visit at least twice a year all the foster homes and institutions.

Extent of child welfare work under the new law—Under the new law the following branches of child welfare work will be conducted by the communal social welfare committees:

1. Supervision over children under 14 brought up outside of their own homes, all illegitimate children under 7, children under 18 residing with parents who receive aid from public funds

2. Preventive care of children residing with their parents or guardians, but lacking proper care or presenting problems of behavior

3. Supervision over children removed from their homes because they present problems of character or behavior or because they were mistreated by their parents or guardians

4. Care of juvenile delinquents who are not prosecuted or whose penalties have been remitted

5. Widows' and widowers' pensions

6. Public aid to children

7. Feeding of children in public schools

8. Maternity aid from public funds—

Lovtidende (official collection of laws of Denmark), Copenhagen, 1933, No. 28, and volumes for 1911, 1920, and 1928. *Socialt Tidsskrift*, Copenhagen, 1933, vol. 9, No. 4. Translator's comment.

A SELECTED PUBLIC HEALTH BIBLIOGRAPHY WITH ANNOTATIONS

Social Hygiene Marches On—How the various state and local health department venereal disease bureaus and non-official social hygiene associations survived or failed to survive the stormy days of the fourth year of hard times is recounted in bald detail. And the account is far from discouraging.

ANON. *Inventory for 1933. J. Social Hyg.* 20, 2:53 (Feb.), 1934.

Graded Milk Ordinance Enforcement—Cities which have enacted the standard (U.S.P.H.S.) milk ordinance and enforced it with sufficient thoroughness to achieve a rating of 90 per cent or better are listed. The purposes of the listing are to encourage cities in well doing and provide travelers with the names of places where they may drink milk without misgivings.

ANON. *Milk Sanitation Ratings of Cities. Pub. Health Rep.* 49, 4:111 (Jan. 26), 1934.

British Eugenic Sterilization Study—There is no ground for alarmist views of racial deterioration; no way to separate sharply dullness and mental defect; no scientific value in the Kallekak and Jukes chronicles; no evidence that sterilization of certified feeble-minded of previous generations would have affected incidence of mental defect in this; no evidence of excessive fertility in feeble-minded; no substitute for institutional care. On the other hand: two-thirds of all defectives are capable of community life; defectives make inefficient parents. The committee of the B.M.A. doubts the wisdom of compulsory sterilization, but if voluntary sterilization is to be enforced,

elaborate, and adequate safeguards are proposed.

ANON. Sterilization of Defectives. *Brit. M. J.* 3812:161 (Jan. 27), 1934.

Communicable Disease and the Nurse—"The modern health officer adapts his control measures to fit the epidemiological characteristics of each disease. . . . Just as the manner of the attack varies with the peculiarities of the several diseases, so will the rôle of the public health nurse be dependent upon those special characteristics of the disease which lend themselves to the nursing approach."

ANDERSON, G. W. The Rôle of the Public Health Nurse in Communicable Disease Control. *Pub. Health Nurs.* 26, 2:66 (Feb.), 1934.

Pasteurizing Canadian Milk—Almost everything that can be said about the pasteurization of milk will be found in this series of Canadian papers. The discussion, which is inclusive though not particularly new, covers milk-borne diseases, relative nutritional values, ordinances, supervision of pasteurization, and defects to be found in the plants.

BELL, W. J., *et al.* Safe Milk (etc.). *Canad. Pub. H. J.* 25, 1:1 (Jan.), 1934.

Business-like Epidemiology—How the Chicago Department of Health went about tracing down and showing up cases in the amebic dysentery outbreak (totaling 721 cases in 206 towns) is graphically recounted. A thorough and important committee report implicating cross connections is appended.

BUNDESEN, H. N., *et al.* The Outbreak of Amebiasis in Chicago During 1933. *J.A.M.A.* 102, 5:367 (Feb. 3), 1934.

Does the "Modern Pace" Kill?—If death rates in circulatory and renal conditions are studied as a whole, increases after the fifth decade are slight and have mounted little since 1910. Rates for infectious diseases have fallen

in every age group. If circulatory and infectious rates are added, the combined death rate tends to attain equilibrium. The theory that "stress and strain" accounts for present day cardiac death rates is not supported, for the rise in circulatory diseases depends on the fall in the infectious diseases, not in early life, as often assumed, but in the very decades in which circulatory increase occurs.

CORRY, A. E., and LINGG, C. Heart Disease from the Point of View of the Public Health. *Am. Heart J.* 9, 3:283 (Feb.), 1934.

Children of Tuberculous Parents—Tuberculosis mortality, 15-39 years, was two or three times as high among the offspring of white tuberculous parents as in a control group. Removal of the ill parent or carelessness in the home seemed to be of little importance.

EVARTS, H. W., *et al.* Tuberculosis Among the Children of Tuberculous Parents. *Am. Rev. Tuberc.* 29, 2:123 (Feb.), 1934.

About Children's Sleeping Habits—Warm milk at bedtime induces quiet sleep in children; other beverages have no consistent effect. Large amounts of food at bedtime result in marked restlessness. Baths seem to have no constant effect. Children have definite sleep patterns; they are quieter in cold weather than in hot.

GIDDINGS, G. Normal Sleep Pattern for Children. *J.A.M.A.* 102, 7:525 (Feb. 17), 1934.

Difficulties in Dealing With Amebic Dysentery—Some of the uncertainties about the late Chicago amebic dysentery cases are presented to round out the picture of the outbreak's epidemiology. Even as to hand washing by food handlers the question is raised: "It remains to be seen whether any considerable number of individuals can be made sufficiently conscious of the possible menace to others to render this measure effective."

McCox, G. W. Amebic Dysentery. Pub. Health Rep. 49, 5:141 (Feb. 2), 1934.

Preventing Congenital Syphilis—Antenatal treatment of pregnant syphilitic patients reduces fetal deaths and syphilitic infants strikingly; results are proportionate to treatments given; even a few treatments will materially alter the outcome.

McKELVEY, J. L., and TURNER, T. B. Syphilis and Pregnancy. J.A.M.A. 102, 7: 503 (Feb. 17), 1934.

Putting Taste-Appeal in the British Diet—"If we imagine that there is great need for economy in the family budget, we even suggest bloaters, full of body-building material, for dinner. No doubt they are, but how many people like bloaters. To the man in the street the bloater is a joke, not a food. . . . I have personally tried some of the cheap daily dietaries advocated for diminished family budgets. I did not enjoy the experiment."

MURRAY, J. O. The Public Health Outlook in Nutrition. Pub. Health. 47, 5:162 (Feb.), 1934.

Depression Health De-bunked—In three more cities the new-poor were found to be suffering from diseases greatly in excess of the rate of the still-independents, and of their own rates while they still "had it." "It can be said," concludes the paper, "that none of the beneficent effects often attributed to the economic depression are evidenced by the data. On the contrary, illness has not been most frequent among those who have had to 'tighten their belts' most."

PERROTT, G. St. J. and COLLINS, S. D. Sickness and the Depression. Milbank Quart. Bull. 12, 1:28 (Jan.), 1934.

Streptococci in Colds and Influenza—Streptococci and pneumococci isolated in studies of colds, in-

fluenza, and pneumonia have distinctive curves of cataphoretic velocity. Convalescent serum from colds and influenza cases slows the cataphoretic time of the respective streptococci and this (corresponding with the specific antibody action) indicates the close relationship of streptococci from colds and influenza and that they have etiologic significance.

ROSENOW, E. C. Cataphoretic Time and Velocity of Streptococci and Pneumococci. J. Infect. Dis. 54, 1:91 (Jan.-Feb.), 1934.

For Gassed Sewage Works Employees—Victims of carbon monoxide poisoning in sewers or sewage treatment plants, if suffocated, should be given prone pressure resuscitation, warmed, stimulated with coffee or hypos, given complete rest, and for 20 or 30 minutes given oxygen and carbon dioxide. Plants should be equipped with the appropriate apparatus.

SAYERS, R. R. Gas Hazards in Sewers and Sewage Treatment Plants. Pub. Health Rep. 49, 5:145 (Feb. 2), 1934.

Reducing the Tax of Tuberculosis—In this editorial, Professor Winslow develops a telling conception of health economics which other sanitarians might well put to other good uses; upon the subject of reduction of taxes, he recounts the lowering of the tax of tuberculosis on humanity. Similar pictures might be drawn of the tax of typhoid, the tax of diphtheria, etc.

WINSLOW, C.-E. A. One Way to Reduce Taxes. Pub. Health Nurs. 26, 3:119 (Mar.), 1934.

More Typhoid Carriers—How each epidemic of typhoid fever creates a new crop of carriers and establishes the possibilities of food-borne infections is brought home to the water works operator.

WOLPERT, N. W. The Typhoid Carrier Problem. Water Works Engineering. 87, 4:160 (Feb. 21), 1934.

BOOKS RECEIVED

- MODERN SEWAGE TREATMENT. By T. P. Francis. London: The Contractors' Record, 1932. 322 pp. Price, \$7.50.
- ASTHMA, HAY FEVER AND RELATED DISORDERS. By Samuel M. Feinberg. Philadelphia: Lea & Febiger, 1933. 124 pp. Price, \$1.50.
- KEEPING A SOUND MIND. By John J. B. Morgan. New York: Macmillan, 1934. 440 pp. Price, \$2.00.
- I KNOW JUST THE THING FOR THAT! By J. F. Montague. New York: Day, 1934. 265 pp. Price, \$2.00.
- A HEALTH PROGRAM FOR THE CHILDREN OF A COUNTY. By Thomas Gordon Bennett. New York: Teachers College, 1933. 196 pp. Price, \$2.00.
- CHINESE MEDICINE. By William R. Morse. New York: Hoeber, 1934. 185 pp. Price, \$1.50.
- HAPPY HEALTH STORIES. By Mildred H. Comfort. Chicago: Beckley-Cardy, 1934. 160 pp. Price, \$.70.
- STAND UP AND SLEM DOWN. By Ettie A. Hornibrook. New York: Doubleday, 1934. 167 pp. Price, \$1.95.
- THE HARVEY LECTURES, 1932-1933. Various authors. Baltimore: Williams & Wilkins, 1934. 233 pp. Price, \$4.00.

NEWS FROM THE FIELD

TRAINING COURSE FOR HEALTH OFFICERS

THE University of California, in its Intercession and Summer Session of 1934, will offer 12 weeks of intensive training for health officers. The session opens May 14 and closes August 3. The course is open to any person with the degree of doctor of medicine, but because of the nature of the work the class will be limited in number.

The first 6 weeks of the course will be conducted in Berkeley, Calif., under the general direction of Dr. Frank L. Kelly, F.A.P.H.A., and will consist of class instruction, group discussions, and field demonstrations. The next 4 weeks will be spent in the San Joaquin County Health Unit. During this period each student will receive practical field experience under the supervision of Dr. John J. Sippy, F.A.P.H.A. In the last 2 weeks each student will be required to make a survey of the health work in a community near to Berkeley.

The regular fees of the Intercession and Summer Session of \$35.00 for each session will be charged. There will be no laboratory fees.

Applications for admission should be

sent to Dr. John N. Force, Chairman, Department of Hygiene, University of California, Berkeley, Calif., and should be accompanied by a statement of professional training and experience. Those wishing to attend should make application as early as possible.

DR. CAMPBELL GIVES SALMON
MEMORIAL LECTURES

THE 1934 series of Salmon Memorial Lectures will be delivered by Dr. Charles Macfie Campbell, Professor of Psychiatry at Harvard Medical School, Harvard University, and Medical Director of the Boston Psychopathic Hospital. The subjects are announced as follows: Lecture 1, "Trends in Psychiatry," Lecture 2, "Classification vs. Dynamic Analysis," Lecture 3, "Conclusions and Suggestions." The lectures will be given at the New York Academy of Medicine, 2 East 103 Street, New York, on April 13, 20, and 27.

MARYLAND COUNTY HEALTH SERVICE

DR. R. H. RILEY, Director of the Maryland State Department of Health, advises that Caroline County,

Md., has now provided full-time county health service, giving the state a 100 per cent county health service.

Allegany County went on a full-time basis in 1922, and has the honor of being the first to organize such service. With the full coöperation of the county authorities, one after another of the 23 counties has been added to the list. The development by counties has been as follows:

1922—Allegany; 1923—Montgomery; 1924—Frederick, Baltimore, Calvert, and Carroll; 1927—Prince George's, and Talbot; 1928—Harford; 1929—Cecil, and Wicomico; 1930—Kent, Washington, and Anne Arundel; 1931—Garrett, Dorchester, Queen Anne's, and Worcester; 1932—St. Mary's, Charles, Somerset and Howard; 1934—Caroline.

In addition to being responsible for the health service of Anne Arundel County, the unit for that county is used as a training center and furnishes opportunities for field work for students in public health administration.

COMMITTEE ON CHILD WELFARE LEGISLATION

A COMMITTEE to study child welfare laws and to draft a bill on child welfare was recently appointed by the President of Uruguay. The committee consists of 8 members. Most of them are physicians who have been active for many years in child welfare work.—*Diario Oficial*, Montevideo, 1933. No. 8014.

LILLIAN D. WALD'S BIRTHDAY

ON the 10th of March Miss Lillian D. Wald celebrated her 67th birthday, and a group of children from the lower East Side of New York City broadcast their songs to her in Westport, Conn., from radio station WEVD.

Until she moved to the country for her health a year ago, Miss Wald had spent forty years as a neighbor of these children, their parents, and their grandparents on Henry Street. She founded

the Henry Street Settlement in 1893. The children sang under the direction of Mrs. Hedi Katz, head of the Music School of Henry Street Settlement. An interesting gift for Miss Wald was a specially bound volume containing Italian, Russian, and Jewish folk songs of New York's East Side, gathered and written for the first time under the supervision of Mrs. Martha Ramsey.

NURSES' 1934 BIENNIAL CONVENTION WASHINGTON, D. C., APRIL 22-27

THE American Nurses' Association, the National League of Nursing Education, and the National Organization of Public Health Nursing, will all have separate sessions as well as joint meetings of all three.

The *A. N. A. Bulletin* for March, 1934, gives the tentative programs of the A.N.A. and the N.L.N.E., and *Public Health Nursing* for April gives the program of the N.O.P.H.N.

These are the hotels to be occupied as headquarters during the Biennial Convention:

MAYFLOWER—American Nurses' Association.

WILLARD—National League of Nursing Education.

WASHINGTON—National Organization for Public Health Nursing.

WARDMAN PARK—Student Nurses.

POWHATAN—Exhibitors.

For further information, write to the American Nurses' Association, 50 W. 50th Street, New York.

OCCUPATIONAL DISEASE CLINIC

NEW YORK University and Bellevue Hospital Medical College recently opened a special clinic for occupational diseases, with a laboratory equipped for the work. Cases of lead poisoning, silicosis, occupational dermatoses, and benzene poisoning are among the cases being handled in the clinic, which meets Wednesday afternoons. Physicians and industrial health workers have been invited to refer cases.

WASHINGTON STATE HOLDS PUBLIC HEALTH INSTITUTE

A PUBLIC health institute is to be held under the auspices of the Washington State Department of Public Health at the State College of Washington, Pullman, Wash., on May 4-5. It is expected that a permanent organization of public health workers will be effected, possibly to be known as the Washington State Public Health Association.

CAN YOU PROVE IT?

BACHELORS and maids, fathers and mothers, alike received a little blue slip distributed for New Mexico's Bureau of Public Health by the State Comptroller's office with license plates for automobiles. Thus the reaching of a considerable proportion of the state's population was secured at the cost of printing some 60,000 small slips. Our correspondent reports:

As you may imagine, Miss Tober, state registrar, has had some quite amusing replies from the bachelors of the state.

Here is the copy (8 pp.):

Attention, Fathers and Mothers! Your automobile is now legally registered. You can prove its age and ownership. Can you do the same in regard to your baby?

If you are not certain that your baby's birth is registered write to the State Registrar, Bureau of Public Health, Box 711, Santa Fe, New Mexico, for this information.

PERSONALS

DR. HOWARD MORROW, of San Francisco, Calif., member A.P.H.A., has been appointed President of the California State Board of Health, succeeding Dr. John H. Graves.

DR. BERNARD W. CAREY, of Detroit, Mich., F.A.P.H.A., medical director of the Children's Fund of Michigan, was elected President of the Michigan Public Health Association at its last annual meeting, succeeding Dr. William J. V. Deacon, of the State Department of Health, also Fellow A.P.H.A.

CONFERENCES

April 16-17, Eighth Annual Meeting of the Florida Section of the American Water Works Association, Daytona Beach, Fla.

April 16-20, Eighteenth Annual Clinical Session of the American College of Physicians, Chicago, Ill.

April 22-27, Nurses' 1934 Biennial Convention. American Nurses' Association, National Organization for Public Health Nursing, and National League of Nursing Education. Washington, D. C.

April 26, A Hearing on the Problems of Cancer, under the auspices of the New York City Cancer Committee, New York, N. Y.

May 1-6, National Conference on Fundamental Problems in Negro Education, Washington, D. C.

May 14-17, 30th Annual Meeting of the National Tuberculosis Association, Cincinnati, Ohio.

May 15-20, Meeting of Royal Sanitary Institute, Norwich, England.

May 26-29, Annual Meeting of American Association on Mental Deficiency, New York, N. Y.

June 4-8, Annual Convention of the American Water Works Association, Hotel Commodore, New York, N. Y.

June 11-13, Twenty-third Annual Meeting of the Canadian Public Health Association, Montreal, Que., Canada.

June 25-27, Annual Conference of Health Officers and Public Health Nurses, together with American Association of School Physicians, Saratoga Springs, N. Y.

June 25-30, Annual Meeting of the American Home Economics Association, New York, N. Y.

July 9-14, Health Congress, to be held under auspices of the Royal Sanitary Institute, Bristol, England.

August 6-10, Annual Meeting of the American Dental Association, St. Paul, Minn.

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Exposure as a Factor in the Age Distribution of Measles, Diphtheria, and Poliomyelitis^{*†}

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IN the last analysis the distribution of infectious disease is primarily a function of exposure to, and infection ‡ with, the causative agent although it may be secondarily markedly modified by other factors such as immunity from previous exposure, some other quality of resistance on the part of the host, or by variation in the dosage or virulence of the infective agent. For example, it may be stated with a very considerable degree of certainty that certain "diseases of childhood" have come to be designated as such, first, because opportunity for infection is likely to come relatively early in life, and second, because with advancing age an increasing increment of the population is immune to the disease as a result of this earlier exposure.

However, as is well known, the diminution in the frequency with which certain of these diseases occur with increase in age in seeded populations cannot be wholly accounted for by increase in serologic immunity with age. In certain diseases the chances of infection have seemed so general that this discrepancy has been ascribed by some epidemiologists to a nonspecific resistance which is a function of increase in age itself, equal chances of infection at all ages being assumed.

In the case of certain helminths and protozoa young animals are naturally or may be experimentally infected, while it is difficult or in some cases impossible to infect older animals in which immunity from previous exposure can be ruled out. This indicates a greater resistance on the part of the older.

On the other hand, Smillie and Augustine,¹ and Augustine, Helmy and Nazmi² have shown that the occurrence of ancylostomiasis and ascariasis in man at different ages varies directly with insanitary habits making for exposure and permitting infection. The data presented in this paper, it is be-

* Read before the Epidemiology Section of the American Public Health Association at the Sixty-second Annual Meeting in Indianapolis, Ind., October 11, 1933.

† This work was supported by the Harvard Infantile Paralysis Commission.

‡ For the sake of clarity the term "infection" in this paper is used to describe actual contamination or infestation with the infectious agent in question while the term "exposure" is used to designate proximity to a source of infection, usually residence in the same household with a case, but not necessarily actual harborage of the infectious agent.

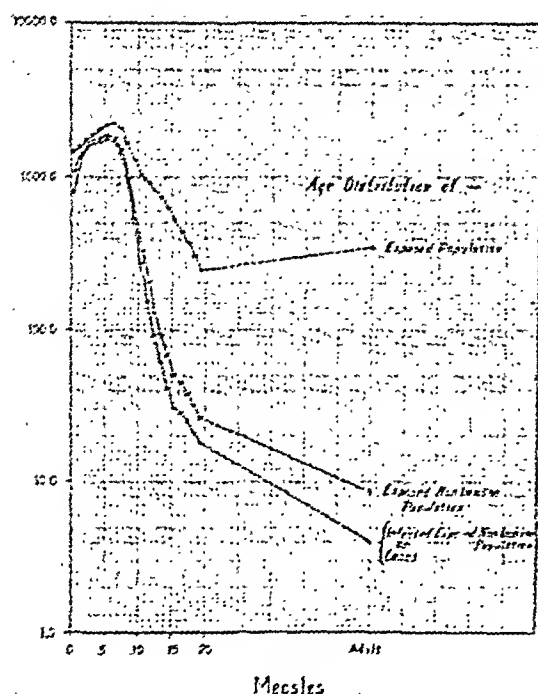


CHART I

lieved, tend to show that variations in the occurrence of measles, diphtheria and poliomyelitis at different ages, over and above that which may be ascribed to "immunity from previous exposure," are due in part to variation in the frequency of exposure at different ages, and in part to variation in frequency of infection in the exposed. Observations by Pope³ showing a difference in the incidence of scarlet fever in exposed males and females indicate that the variation in the frequency of this disease as between males and females under the same apparent conditions of exposure corresponds with obvious differences in personal, social, or what might be called household habits, of the two sexes at different ages, which habits in themselves constitute the necessary conditions for infection.

The data employed in making the computations on measles are those published by Chapin⁴ relating to 14,376 cases, 1917-1923 in Providence, comprising the number of persons exposed (living in the family with a case), the

number of immunes (giving a history of a previous attack) and cases, all by single year age groups up to 20 years, and the totals for adults. After making an additional adjustment for estimated transient maternal immunity in infants and using three-way moving averages to facilitate comparison, Chapin's data are plotted in Chart I. The essential point brought out by Chapin in the present connection is that there is considerable variation dependent on age in the frequency with which non-immunes in families with a case of measles contract the disease. After giving due consideration to the question of forgotten attacks, about 90 per cent of non-immune children, and less than 20 per cent of non-immune adults contracted the disease. From collateral knowledge of measles there are reasons for believing that an enumeration of cases would actually represent infected exposed non-immunes. Thus from the difference between the age curve of exposed non-immunes and that of cases an age curve of infection in exposed non-immunes can be figured.

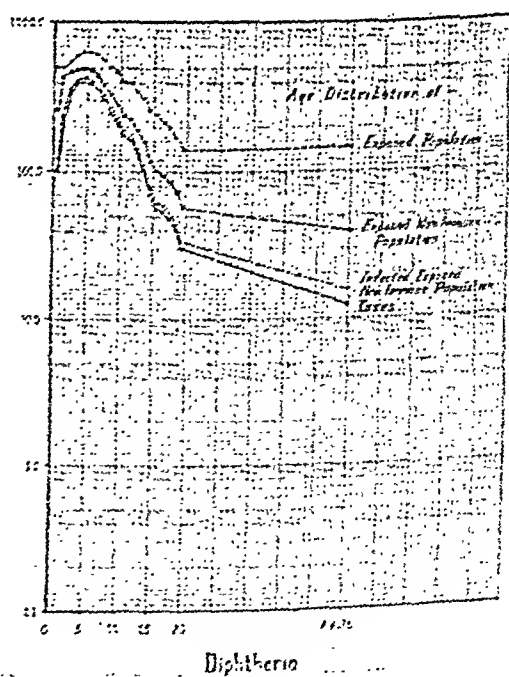
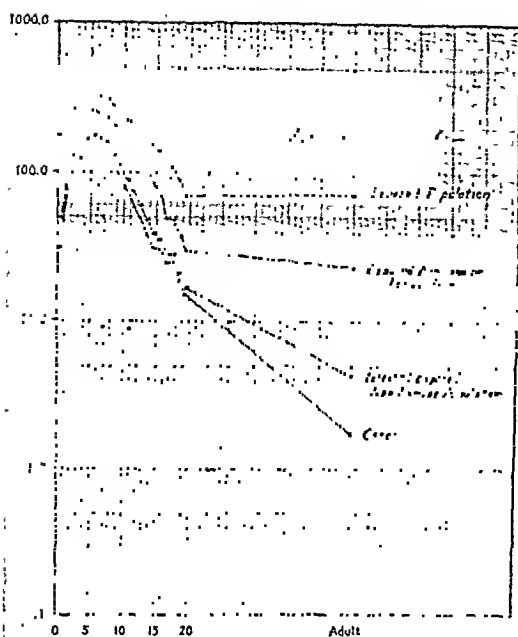


CHART II



Polio-myelitis

CHART III

The data used in diphtheria are taken from the annual reports of the Superintendent of Health of Providence (Chapin)⁵ 1889–1901, comprising tabulations similar to those for measles. Chapin's data on diphtheria are similarly plotted in Chart II, calculating the non-immunes from average Schick results,⁶ and the infected exposed non-immunes by using an age curve of infection obtained by actual culture on other members of the family with a case. Such a computation, when compared with the age curve for cases, indicates that at all ages cases of diphtheria closely parallel infected exposed non-immunes. In other words, actual infection in non-immunes produces diphtheria with approximately equal frequency at all ages. However, this does not mean that all infected non-immunes develop the disease, but only that risk of disease in infected non-immunes appears to be equal at all ages.

The data on poliomyelitis (Chart III) are those collected in the course of field investigations of 1,573 cases of the disease in Massachusetts, 1927–1931, with similar tabulation of cases and all members of the families in which the cases occurred, by age. The number presumably immune, by reason of a previous attack, was of course negligible. The computation of non-immunes is on the basis of results obtained with the neutralization test on the general population of Massachusetts⁷—on a small scale to be sure—but giving figures closely corresponding to immunity to diphtheria as shown by the Schick test. For calculation of the infected exposed non-immunes in poliomyelitis, the diphtheria age curve of infection is used. Whatever justification for this there may be lies in the belief that the close correspondence between the rate of development of immunity to diphtheria and of poliomyelitis from the point of view of age is indicative of similar laws of infection in the two diseases. It will be noted that, as in diphtheria, the calculated age curve of infected non-immunes fairly closely parallels the age curve of cases.

In Chart IV are shown the age curves of infection as indicated by Chapin's data on measles and as determined by cultures on members of families with

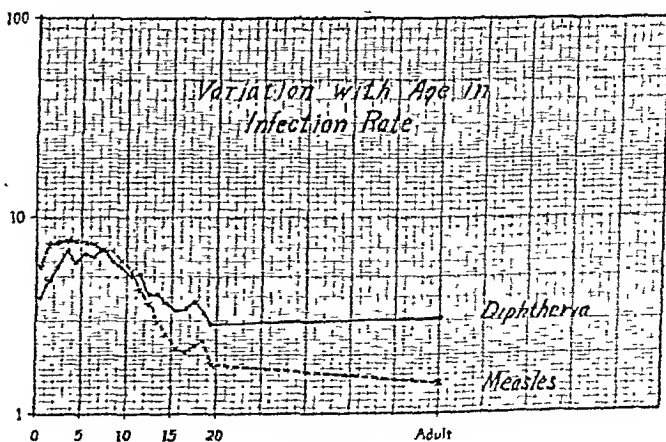


CHART IV

cases of diphtheria. These curves are adjusted for comparison of age only. Studies by Kusama and Doull⁸ on carrier infection among family associates of diphtheria patients and carrier studies in school children by Doull and Fales⁹ are in general agreement with Chapin's findings in diphtheria, in so far as variation in the frequency of carriage with age is concerned.

Perhaps the point may be made clearer by expression of the results in terms of attack rates at different ages. In charts V, VI, and VII are shown the age distribution of cases of the three diseases together with attack rates in the total population, in the exposed population, in the exposed non-immune population, and, finally, in the calculated infected exposed non-immune population. All the curves are adjusted to bring them into comfortable position without distortion for comparison so far as age is concerned, and hence are to be taken as representing variation with age only and not as actual rates.

It suffices to point out that in measles

the comparative attack rates in infected exposed non-immunes for different age groups, from the nature of the data, plot as a straight line; those of diphtheria and poliomyelitis, although irregular, likewise suggest an attack rate in infected exposed non-immune individuals approximately equal at all ages.

CONCLUSIONS

The variation in the occurrence of measles, diphtheria, and poliomyelitis in non-immune persons at different ages would appear to be due in part to a difference in the frequency with which persons of different ages are exposed to respective viruses, and in part to a difference in the frequency with which persons of different ages are infected under the same apparent degree of exposure.

The differences in the risk of infection at different ages in measles, diphtheria, and poliomyelitis would appear to be due to quantitative or qualitative differences in personal, social or house-

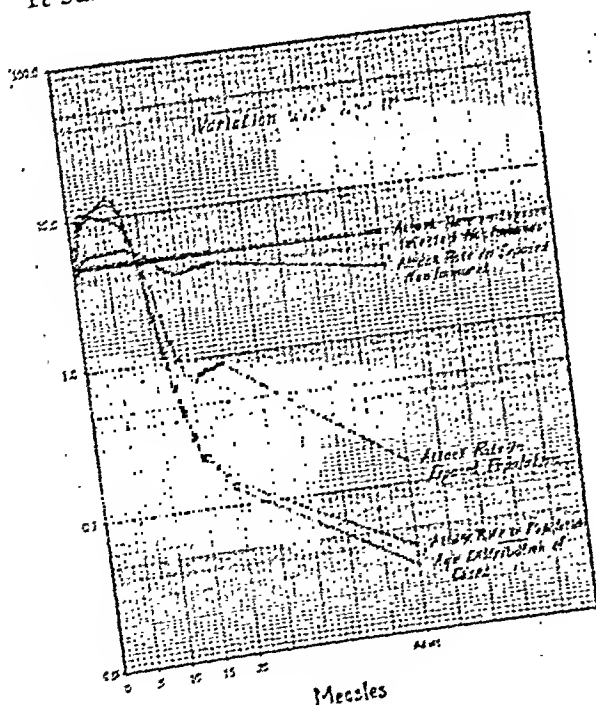


CHART V

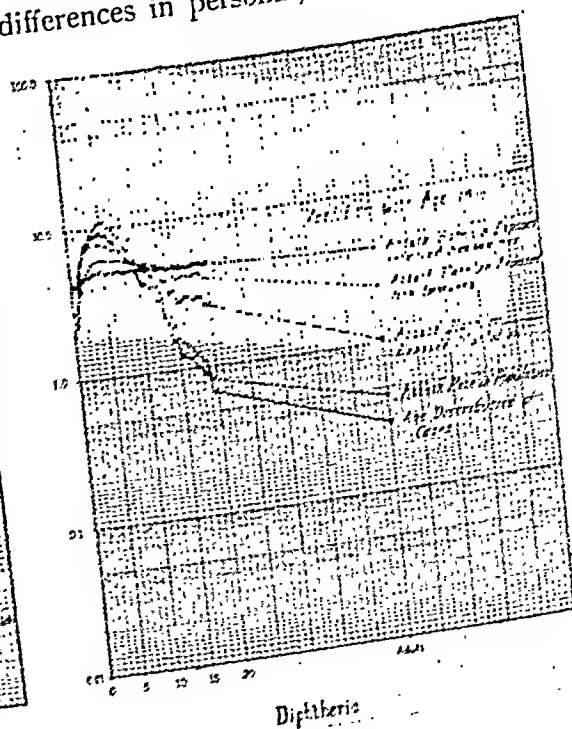
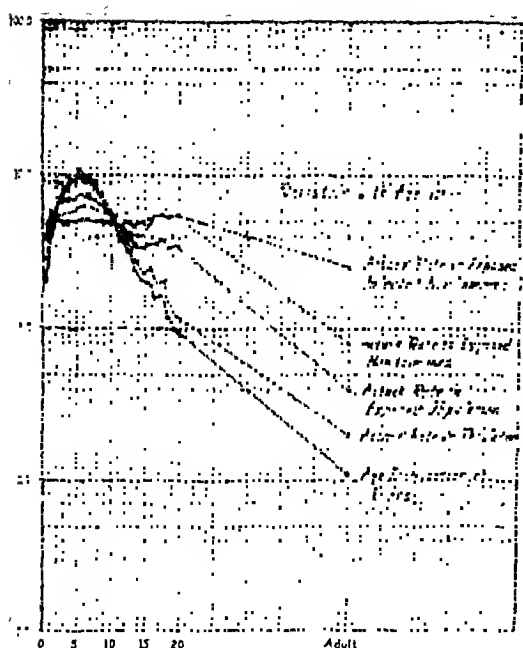


CHART VI



Poliomyelitis

CHART VII

hold habits of persons of different ages, which habits constitute sanitary habits in the present connection.

However, there is nothing in this which would detract from the view, previously expressed,¹⁰ that whether disease is to be the result of infection in a non-immune individual—at least so far as poliomyelitis is concerned—is determined by autarceologic factors. In

fact, since this study indicates that variation in these diseases with age can be accounted for wholly by exposure, infection, and immunity, it implies that autarcesis, although varying with climate and possibly with season,¹⁰ does not vary with age.

This study suggests further investigation of household habits at different ages looking to a clearer definition of the degree of exposure necessary for infection and possible improved sanitary measures against the spread of "contact" infections.

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Faddism

... Finally, we should avoid faddism and easy ways to attain an hypothetical goal, scrutinizing with care the elaborate claims of manufacturers of this, that, or the other concentrated, desiccated and biologically assayed preparation.

Man cannot live by bread alone, but neither can he substitute for the natural fruits of the earth the dynamic contents of a pill of any potency.—Joseph Garland, M.D., *Dental Health*, *New Eng. J. Med.*, Mar. 15, 1934, p. 570.

The Isolation Time of Scarlet Fever*

J. E. GORDON, PH.D., M.D., AND G. F. BADGER

*Division of Epidemiology, Herman Kiefer Hospital, Department of Health,
Detroit, Mich.*

A REVIEW of American administrative practice¹ demonstrated an isolation period of about 4 weeks as the accepted standard for scarlet fever. Twelve among 44 of the largest cities of the United States required restriction of the patient for at least 28 days, and in 20 cities the period was 30 days. The minimum isolation varied from 21 days in 9 cities, to 42 days in 2.

Successful isolation of a specific communicable disease demands satisfactory protection of both immediate and remote contacts with minimal restriction of the patient. Control measures should, furthermore, be adjusted to the current behavior of the disease. Because of the present mildness of scarlet fever, restrictions may well be decreased. At the time isolation regulations were formulated, scarlet fever was a far more serious condition. In the event that the disease should show a tendency to return to its former severity, regulations should be revised promptly.

Present-day practice in the isolation of scarlet fever is based on empiric opinion, with general rules for all patients, irrespective of severity of the disease or the probable degree of communicability. Lack of information requires this type of administrative practice. It contrasts sharply with the

efficient and individualized regulations for patients with diphtheria or typhoid fever.

Observations in Detroit,² showed that after 4 weeks of uncomplicated scarlet fever, no more satisfactory control was accomplished by requiring absence of hemolytic streptococci in cultures from the nose and throat before patients were released. The measure of efficiency was the infecting case rate, namely, the percentage of patients known to be responsible for familial scarlatinal infections within 30 days after release. The infecting case rate was reduced somewhat by requiring negative cultures before dismissing patients with suppurative complications.

Because of the deficiencies in bacteriological control, studies were directed toward determining differences in the clinical and epidemiological nature of the disease which could be applied practically in the individualization of control measures.

The incidence of secondary cases was found to vary with the age of the original patient, the presence or absence of complications, and the season of the year. Information collected during several years indicated that, after release, children were far more likely to transmit infection than were older persons. For children under 5 years of age the infecting case rate was 5.5 per cent, 11 times that for patients older than 14 years. Every age group had an infecting case rate during the summer which was less than that of the winter and spring.

* Read before the Epidemiology Section of the American Public Health Association at the Sixty-second Annual Meeting in Indianapolis, Ind., October 11, 1933.

These studies were aided by grants from the Rockefeller Foundation, the Commonwealth Fund of New York, and the Committee on Administrative Practice of the American Public Health Association.

This information suggested the reasonableness of varying the isolation time with the season of the year and distinctly shortening the restriction for older persons. These theoretical considerations have been tried for 4 years under field conditions.

Since 1929 the isolation requirements for patients with uncomplicated scarlet fever have been reduced gradually (Table I). During the winter and

shortened to 3 weeks. Those less than that age were restricted for the usual 4 weeks throughout the year. Throughout the next year, 1931, the older group was isolated for only 3 weeks, except that in November the division between older and younger persons was changed to 15 years instead of 20. Children were isolated for 4 weeks during the months of January through June, and for 3 weeks from July 1 to November 10. The revision of 1932 established the isolation period for patients over 15 years at 3 weeks for the first 6 months and only 2 weeks for the summer and fall. The isolation time for children remained the same as in 1931, except that the 3 weeks' isolation period extended throughout December, instead of ending November 9. No changes were made in 1933. In 1934, the regulations which have recently applied only to the summer and autumn months, will be extended throughout the year, so that for the whole of 1934 older persons will be isolated for 2 weeks and children for 3 weeks, providing the infection is uncomplicated. The younger group will, however, be restricted to the premises for an additional week of observation.

TABLE I
MINIMUM ISOLATION TIME FOR UNCOMPLICATED
SCARLET FEVER—DETROIT

Time	Isolated 4 weeks	Isolated 3 weeks	Isolated 2 weeks
Jan. 1, 1929– Dec. 31, 1929	All ages		
Jan. 1, 1930– June 30, 1930	All ages		
July 1, 1930– June 30, 1931	Under 20 years	20 years and over	
July 1, 1931– Nov. 9, 1931		All ages	
Nov. 10, 1931– June 30, 1932	Under 15 years	15 years and over	
July 1, 1932– Dec. 31, 1932		Under 15 years	15 years and over
Jan. 1, 1933– June 30, 1933	Under 15 years	15 years and over	
July 1, 1933– Dec. 31, 1933		Under 15 years	15 years and over
1934—entire year		Under 15 years	15 years and over

spring of 1930 patients 20 years of age and over were isolated for the usual 4 weeks, but for the months of July through December the time was

COMMUNICABILITY OF SCARLET FEVER AT DIFFERENT AGES

The year 1929 is used as a basis for comparison in determining the relative

TABLE II
CASES, INFECTING CASES, AND INFECTING CASE RATES BY AGE GROUPS

Year	Number of patients			Infesting cases			Infesting case rate*		
	0-14 years	15+ years	All ages	0-14 years	15+ years	All ages	0-14 years	15+ years	All ages
1929	2,220	788	3,008	110	4	114	5 0	0 5	3 8
1930	1,521	397	1,918	61	3	64	4 0	0 8	3 3
1931	1,753	400	2,153	59	3	62	3 4	0 8	2 9
1932	2,599	454	3,053	93	6	99	3 6	1 3	3 2
1933	1,766	297	2,063	68	2	70	3 9	0 7	3 4

* Infesting case rate is the percentage of patients released from the hospital, known to be responsible for familial scarlatinal infections within 30 days after release.

TABLE III

HOME ISOLATION OF SCARLET FEVER, DETROIT, 1932
DURATION OF ISOLATION BY AGE AND SEASON, AND THE PROPORTION
RELEASED WITHIN MINIMUM REQUIREMENTS

Age Group	January—June							July—December								
	Wk. of isola. patient rels'd						% rels'd min. time	Wk. of isola. patient rels'd						% rels'd min. time		
	1st wk.	2nd wk.	3rd wk.	4th wk.	5+	Totals		1st wk.	2nd wk.	3rd wk.	4th wk.	5+	Totals			
0-4	-	2	10	78	27	117	76.9	1	2	62	12	5	82	79.3		
5-9	9	17	28	202	70	326	78.5	7	12	133	81	22	255	59.6		
10-14	1	5	14	53	16	89	82.0	2	3	21	13	4	43	60.5		
15-19	-	1	5	4	1	11	54.5	-	2	3	-	-	5	40.0		
20-29	-	-	10	3	1	14	71.4	-	5	2	3	-	10	50.0		
30-39	-	1	4	2	1	8	62.5	-	4	5	1	-	10	40.0		
40+	-	-	-	3	1	4	0.0	-	-	-	-	-	-	-		
Totals							569	77.3							405	62.7

These figures represent a sample of 974 from a total of 2,356 cases isolated at home. Cases reported after the first week of illness where the date of onset could be determined definitely were given credit for this time. Therefore, the actual isolation was less than the prescribed minimum.

worth of these shortened isolation periods. This was the last year in which a minimum 4 weeks' isolation was maintained for all patients. The infecting case rate in 1929 was 3.8 per cent and represents the average experience in Detroit. The rate for adults over 15 years of age was 0.5 per cent; that for children, 5.0 per cent (Table II).

The infecting case rate in the years that followed did not exceed that of the control years although the isolation time was progressively shortened. The

1931 rate was materially better. The relative frequency of infecting cases among adults and children was not disturbed, despite the fact that during 2 of the years, 1932 and 1933, the isolation period for adults was decreased by a half. The reduction in days of disability has been material (Table III).

SEASONAL VARIATIONS IN INFECTIVITY OF SCARLET FEVER

A seasonal variation in the communicability of scarlet fever has been

TABLE IV
CASES, INFECTING CASES, AND INFECTING CASE RATES BY SEASON AND YEAR

Year	Number of patients					Infecting cases					Infecting case rates				
	Jan. Mar.	Apr. June	July Sept.	Oct. Dec.	Totals	Jan. Mar.	Apr. June	July Sept.	Oct. Dec.	Totals	Jan. Mar.	Apr. June	July Sept.	Oct. Dec.	Totals
1929	847	1,290	386	485	3,008	33	39	8	34	114	3.9	3.0	2.1	7.0	3.8
1930	708	716	237	257	1,918	27	28	2	7	64	3.8	3.9	0.8	2.7	3.3
1931	545	968	412	228	2,153	27	21	9	5	62	5.0	2.2	2.2	2.2	2.9
1932	863	1,451	462	277	3,053	37	41	8	13	99	4.3	2.8	1.7	4.7	3.2
1933	699	914	166	284	2,063	26	24	5	15	70	3.7	2.6	3.0	5.3	3.4

demonstrated for patients isolated 4 weeks.² This was attributed in large part to the greater frequency of complications during the winter and spring months. However, there is a seasonal difference in the frequency of secondary cases after simple, uncomplicated scarlet fever. These observations indicated that a variation in the length of isolation dependent upon season might also be practicable. This was first tried in 1930 (Table I).

Despite decreased isolation periods, the gross infecting case rate has not increased during any of the 4 years. The relatively greater rates during winter compared with summer months has been maintained each year. The average rate for the summers is slightly less than the rate for the summer of the control year, but not significantly. The 4 year program materially decreased the period of restriction with no apparent spread of infection (Table IV).

CONVALESCENCE OF ADULT PATIENTS RELEASED AFTER 14 DAYS

A public health program for preventing the spread of a communicable disease should be distinguished from its medical management. The time limits are not necessarily the same. With a disease such as typhoid fever, public health care may be essential well beyond the time when the patient has recovered clinically. By contrast the complications of scarlet fever and measles may require medical observation much longer than demanded by any danger of communicability. If the need for medical care exceeds the limits of communicability, restriction to an indoor life may well be terminated in the interests of a more favorable convalescence. Furthermore, the loss of school time for child contacts and the loss of employment for those of adult age is reduced. Realizing the distinction and yet the equal importance

of public health care and medical care, the results have been determined from both viewpoints, when adult patients were released after a period as short as 2 weeks.

It is a matter of common observation that complications of scarlet fever develop most frequently during the 3rd week of the disease, the so-called second or allergic disease period. However, the common suppurative complications are largely limited to children. During the past 2 years 139 adult patients have been released after 14 days' isolation. Essentially one-half were isolated in the hospital and one-half at home. About 60 were restricted for longer periods because of complications or because of possible continued communicability. The latter was the more usual but often an indefinite reason. Perhaps these patients had enlarged tonsils before contracting scarlet fever, or had crusting of the nasal mucosa without active rhinitis, or other minor irregularities of the upper respiratory tract. From a public health standpoint the program has resulted satisfactorily in that only 1 secondary case of scarlet fever has been detected.

The health of convalescent patients released after 2 weeks' isolation has been determined by the epidemiologist visiting the home 2 weeks after release, and again 1 month later. None of the ordinary suppurative complications of scarlet fever were found. A woman who had suffered from a pituitary condition with complaint of heart attacks for 9 years was of the impression that her cardiac condition had been exaggerated by the attack of scarlet fever, but not to an extent that she called a physician. A second patient had fever and chills 1 week after release due to mastitis following an original puerperal scarlatina.

The appreciable decrease in the length of isolation resulted in no apparent deleterious effect, either clinically

or from the standpoint of the public health.

COMPLETENESS OF REPORTING IN SCARLET FEVER

The equally efficient results with shorter isolation periods suggested investigation of the significant features involved in the present program for attempted control of scarlet fever. There is the immediate objective of determining factors other than age, season, and complications, which may permit additional variations in restriction. It is worth while to examine critically even the actual value of isolation in the control of scarlet fever.

It is fundamentally important to compare the attack rates among contacts to unrecognized and non-isolated sources of infection, with that for contacts of patients restricted by current isolation measures. Determinations have been made of the completeness with which actual cases of scarlet fever are reported and isolated, likewise the frequency and importance of atypical scarlatinal and nonspecific streptococcal infections among immediate contacts. Attempt has been made to determine the number of cases of scarlet fever in a given outbreak, for example, in a school, that can be traced to various kinds of sources: to known cases, to missed cases, to atypical scarlatina, to nonspecific streptococcal disease, and to the agency of carriers.

A study has been made of 1,065 persons with reported and verified scarlet fever, together with their familial, school, and neighborhood contacts, particularly playmates. The number of patients isolated in their own homes was 663, and 402 went to the communicable disease hospital. In addition to the 1,065 reported cases, 253 other persons had an acute febrile illness with sore throat, and either an eruption of the skin, or desquamation, or both; and yet were neither reported nor isolated.

Even with the most careful investigation, all missed cases cannot be determined, particularly among neighborhood and school contacts. The number that was found is probably less than the number that actually occurred.

Familial contacts were observed for illness other than actual scarlet fever during or immediately following the period of isolation. Many had suggestive scarlatinal infection, but without rash or desquamation. The most common condition was sore throat with 180 contacts so affected; 28 are known to have had fever, and 19 vomited. Complications peculiar to scarlet fever were frequent, in about the same proportion as with classical scarlet fever. Table V compares the frequency of complica-

TABLE V
FREQUENCY OF COMMON COMPLICATIONS IN SCARLET
FEVER, AND AMONG CONTACTS WITH UPPER
RESPIRATORY INFECTIONS

Complication	Scarlet Fever Home Isola- tion	Contacts to Scarlet Fever	
		Having Sore Throat	Having Other Upper Respiratory Infections
Per cent with Otitis media, suppurative	7	3	8
Per cent with Otitis media, catarrhal	6	2	4
Per cent with Rhinitis and Sinusitis	28	30	*
Per cent with Cervical Lymphadenitis	15	10	8
Number of patients	663	180	158

* Indefinite because of history of "colds"

tions among these persons, with that for a group of scarlet fever patients isolated at home, and living under comparable conditions. Acute rhinitis and sinusitis was observed 54 times, 5 had suppurative otitis media, and 18 suffered with severe cervical lymphadenitis.

Upper respiratory infections (158 cases), largely of the type of common

cold, formed a second group. Complications such as suppurative otitis media and cervical adenitis were also essentially as frequent as with scarlet fever (Table V). According to available information, the 1,065 reported cases were but a part of the opportunities for spread of the disease. There were, in addition, at least 253 definite and 338 possible sources of infection.

The reaction to the Dick Test was determined for all contacts at the time of report of the original case of scarlet fever. Cultures for hemolytic streptococci were made from the nose and the throat. The tests were repeated 2 months later. Analysis of these data will give pertinent information as to the streptococcal nature of these indefinite infections, the frequency of carriers of streptococci among contacts, and may permit some evaluation of the significance of these groups in the spread of scarlet fever. It is hoped that the presumable change in immunity indicated by an altered reaction to the Dick Test, from positive to negative, may give some idea of the prevalence of subclinical infection.

There is reason to doubt the possibility of controlling scarlet fever by rigorous measures limited to reported cases. This opinion has confirmation in the 1927 report³ of the Committee of Medical Officers of the Ministry of Health, Great Britain, that "the incidence of the disease in the country generally appears to show no marked reduction as the result of hospital isolation, or indeed of any other measure of public control." The extent of the equally important and at present uncontrolled sources of infection justifies for reported cases a minimum requirement in time and method of isolation, which will produce a measure of safety, but not the apparently unattainable end, absolute public protection, which has been the objective of contemporary programs.

PROMPTNESS OF REPORTING IN SCARLET FEVER

Incomplete reporting has been demonstrated, under what is felt to be representative American public health administration. Prompt reporting is equally important. Most secondary cases are infected at the time of onset and during the early days of primary cases of scarlet fever (Table VII). Sig-

TABLE VI
DAY OF ILLNESS THAT SCARLET FEVER WAS REPORTED

Day of illness	Patient isolated at hospital	Patient isolated at home	Totals	Per cent of total
1	45	46	91	5 0
2	199	197	396	21 6
3	227	252	479	26 1
4	128	207	335	18 3
5	72	72	144	7 9
6	23	48	71	3 9
7	22	17	39	2 1
8-14	38	56	94	5 1
15-21	32	46	78	4 3
22-28	8	27	35	1 9
29+	3	2	5	0 3
Unknown	3	3	6	0 3
Not isolated			60	3 3
Totals	800	973	1,833	100 0

nificant delay in reporting can presumably vitiate the effect of an otherwise satisfactory program of control. Representative records of 1,833 primary cases of scarlet fever during 1932 have been examined for the promptness with which official report was made to the Department of Health (Table VI).

The rash of scarlet fever ordinarily appears on or before the 3rd day of the disease. In a sample of 717 cases, 667 (93 per cent) developed within this time. An additional 40 (6 per cent) developed the rash the next day, so that only 1 per cent should have gone unrecognized for longer than 4 days.

TABLE VII

THE EFFECT OF DELAYED ISOLATION ON THE ATTACK RATE OF SUSCEPTIBLE CONTACTS
TIME OF ISOLATION OF THE PRIMARY CASE, AND THE DAY OF DEVELOPMENT OF THE SECONDARY CASE

	Days of Illness Isola.	Suscept. Contacts	Secondary Cases						Per Cent of Contacts Attacked					
			Before Isola.	Days 1-4 of Isola.	Days 5-7 of Isola.	Rest of Isola.	After Re-lease	Totals	Before Isola.	Days 1-4 of Isola.	Days 5-7 of Isola.	Rest of Isola.	After Re-lease	Totals
Primary Case Hospitalized	1	175	-	-	-	1	5	6						
	2	745	3	9	4	4	25	45						
	3	866	10	7	-	5	4	26						
	4	523	13	6	1	4	7	31						
	1-4	2,309	26	22	5	14	41	108	1.1	1.0	0.2	0.6	1.8	4.7
	5	271	7	2	1	2	5	17						
	6	89	-	1	-	2	3	6						
	7	113	6	2	-	1	2	11						
	5-7	473	13	5	1	5	10	34	2.7	1.1	0.2	1.1	2.1	7.2
	8-14	171	12	2	-	-	3	17	7.0	1.2	-	-	1.8	9.9
Primary Case at Home	15+	208	15	-	-	-	3	18	7.2	-	-	-	1.4	8.7
	Totals	3,161	66	29	6	19	57	177	2.1	0.9	0.2	0.6	1.8	5.6
	1	127	-	1	-	1	1	3						
	2	618	3	6	6	11	5	31						
	3	775	17	14	2	6	12	51						
	4	651	16	10	2	6	5	39						
	1-4	2,171	36	31	10	24	23	124	1.7	1.4	0.5	1.1	1.1	5.7
	5	228	3	1	-	1	4	9						
	6	155	9	7	3	3	-	22						
	7	51	4	3	-	-	-	7						
	5-7	434	16	11	3	4	4	38	3.7	2.5	0.7	0.9	0.9	8.8
	8-14	206	25	3	1	-	-	29	12.1	1.5	0.5	-	-	14.1
	15+	301	24	1	-	1	1	27	8.0	0.3	-	0.3	0.3	9.0
	Totals	3,112	101	46	14	29	28	218	3.2	1.5	0.4	0.9	0.9	7.0
All Cases		6,273	167	75	20	48	85	395	2.7	1.2	0.3	0.8	1.4	6.3

Unless there has been a previous case in the family, the identity of the disease can rarely be determined before the rash appears. A report within the first 3 days can therefore be considered as early. About one-half of the cases in the series met this standard. Another 335, (18 per cent) were notified on the 4th day. Certainly not more than 70 per cent can be considered as reported promptly, namely, on the day of the eruption. As an influence on the number of secondary cases, relatively little benefit accrues from isolation which begins after the 7th day. In addition to the 218 cases reported after that time, there were 60 never reported at all, so that the proportion of totally inadequate notification was 15.2 per cent.

THE TIME RELATIONSHIP BETWEEN PRIMARY AND SECONDARY CASES

The frequent delay in reporting original cases naturally suggests that many contacts are infected before the first case of scarlet fever is isolated. Primary cases are often discovered because of a second familial infection.

In 23 instances scarlet fever first appeared in a family when 2 persons developed the infection on the same day. The 2 were considered the primary infection and neither as a secondary case. With this exception, all multiple infections in a family have been interpreted in relation to the one which first appeared. Three hundred ninety-five secondary cases followed the 1,773 primary reported cases (Table VII). Essentially 42 per cent of the secondary

cases occurred before isolation was started, the attack rate being greater for patients isolated at home than for those subsequently sent to the hospital. An additional 95 (24 per cent) occurred within the accepted incubation period of 7 days after isolation was instituted. According to the more usual incubation period of 3 or 4 days, more than three-fifths of all secondary cases were probably infected before isolation or other control was established, and about two-fifths thereafter.

The secondary cases which resulted from infection during the course of isolation were more numerous when the patient remained at home than when isolated in a hospital. Nevertheless, 19 cases occurred among the contacts of patients removed to the hospital in the interval between the end of the maximum incubation period and their return. The number was not appreciably greater when the original patient remained at home (29). This is conclusive that factors other than the patient are active in the spread of the disease. The number is too great to be attributed to chance infection from contact with other cases in the general community. The agency of carriers and missed cases in the family is directly suggested.

The gain from hospital isolation was overcome by the greater number of secondary cases which appeared after isolation was ended, despite the fact that hospital cases were held much longer (Table VII). The information about the number of secondary cases after release of the first, is not to be compared to the ordinary "return case rate" of hospital practice. Whether the patient was isolated at home or in the hospital, careful investigation was made for subsequent scarlet fever, whether reported or not. The data do not merely represent those who came to attention through return of the second case to the hospital or report to the official agency.

Because almost one-half of the secondary cases occurred before isolation was instituted, a more effective program of control through isolation would necessarily emphasize the need for earlier reporting. The weak feature of the home program was in the early days of scarlet fever and suggests a more rigorous program of stricter requirements during that time. The inadequacies of the hospital program are largely centered in the old problem of transmission of infection after the patient returns home. These defects continue to be a pertinent problem despite long isolation or short, despite attempted bacteriological control or stricter clinical criteria for release.

LENGTH AND EFFECTIVENESS OF ISOLATION IN THE HOME COMPARED WITH THE HOSPITAL

Under present conditions in Detroit neither home nor hospital isolation has possessed any essential advantage in efficient control of the disease. There is the important consideration, however, that the hospital group includes many patients who could have been isolated at home only under unfavorable circumstances because of inadequate housing, severity of the infection, or for other reasons.

There were 3,112 susceptible familial contacts to the patients isolated at home and the secondary attack rate was 7.0 per cent. The attack rate for 3,161 susceptible contacts to the hospital patients was 5.6 per cent.

A fairer comparison of the two methods is obtained by eliminating infections which developed previous to isolation. The effectiveness of a particular isolation program can be logically evaluated only by the results which follow its institution. On this basis the attack rates are 3.8 per cent for home isolation and 3.5 per cent for hospital. A number of persons were without doubt already infected when isolation was

started. There is no reason to believe that the number was greater in one group than in the other. If one attempts to correct for those already infected, by eliminating all secondary infections which developed within the succeeding incubation period of 7 days, the ultimate results are then more favorable to home isolation (home, 1.8 per cent; hospital, 2.4 per cent). This is not a justifiable comparison, because a number of the patients eliminated doubtless developed scarlet fever from exposure after isolation, and not through incubating an infection acquired before that time. When the primary case remains at home, infection can come from this person or from other infected individuals; when removed to the hospital, only from others. Such an interpretation thus distinctly favors the hospital group.

Home isolation, where practised, did have the advantage that 71 per cent of the patients were released from isolation at the end of the minimum time. For hospital patients the proportion was only 46 per cent. By the end of the next week essentially 95 per cent of all patients at home had been released, but more than one-fourth of hospital patients still remained in isolation. Many were restricted for 3 and 4 weeks beyond the prescribed minimum. Almost 5 per cent were in the hospital for more than 2 months (Table VIII).

The common reason for prolonged restriction of hospital patients is the presence of complications. They are often more severely ill than those isolated at home and more complications should be expected. Many were sent to the hospital because of complications which had already developed. Nevertheless, the possibility that scarlet fever patients are more likely to develop complications when hospitalized than when they remain at home should have thorough consideration.

Two other explanations can be made

TABLE VIII
TIME OF RELEASE OF 1,787 SCARLET FEVER PATIENTS,
DETROIT, 1932

Time of Release	Home		Hospital	
	Num- ber	Per cent	Num- ber	Per cent
End of minimum	704	71.3	366	45.8
1 week later	228	23.1	216	27.0
2 " "	36	3.6	103	12.9
3 " "	13	1.3	52	6.5
4 " "	3	0.3	28	3.5
5 " "	3	0.3	35	4.4

for the distinct difference in length of restriction between patients of these two groups. One is that the criteria for release are much more strict in hospital than in home practice, where many physicians are responsible for the release of patients, and many, through other interests, are less conversant with minor evidence of complications in scarlet fever, particularly those related to the nose. Probably the private physician tends to be more lenient than the hospital physician, who is directly responsible to the constituted health authority. Whatever the factors contributing to earlier release under home isolation, the significant thing is that it works just as well as the more prolonged hospital isolation.

Griffith⁴ has demonstrated a number of types of streptococci in association with scarlet fever and has shown that under hospital conditions infection with a second or even third type is not uncommon. He has correlated reinfection with the appearance of complications and with communicability after release. This evidence suggests the desirability of emphasis on home isolation where the opportunities for reinfection are minimal.

The convalescence of patients with a similar initial clinical scarlet fever, isolated on the same day of the disease, and restricted according to these two

methods, should be compared under present-day conditions. Housing and other hygienic factors have altered materially since scarlet fever isolation was first formulated. A far greater proportion of patients might now very practicably be isolated at home.

The hospital always will have an important function in the care of patients who offer definite medical problems. It has the equally important obligation to function as a quarantine station when housing conditions prevent adequate home isolation or when the patient is resident in an institution having no satisfactory facilities for segregating such persons. There will always remain in any well conceived program of control an irreducible minimum who should be isolated in the hospital. The extent of this minimum will quite apparently vary with local conditions, but in American cities will not often exceed one-fourth, which is indeed the standard of the *Appraisal Form*⁵ of the American Public Health Association. Nevertheless, with mild scarlet fever, particularly in those cities and in those countries where almost all are now sent to the hospital, there is need to investigate the practicability of isolating at home a larger proportion of the patients. Earlier dismissal of patients who have been hospitalized, particularly if the clinical course has been uncomplicated, appears to be well justified.

CONCLUSIONS

A shorter isolation period for scarlet fever during summer and autumn has been justified by actual trial under field and hospital conditions. The infecting case rate did not increase when adults were isolated for periods as short as 2 weeks, and children for 3 weeks.

Adults with scarlet fever are less likely to transmit the disease than are children. A reduction in the isolation period from 4 weeks to 3 weeks and subsequently to 2 weeks was tried and

showed that the shorter period for adults led to no greater likelihood of subsequent infection among familial contacts. Visits to the patient after release showed that there was no tendency toward development of complications or exaggeration of other medical problems of convalescence as the result of this program.

Approximately 9,000 days of isolation were saved for all patients with scarlet fever in Detroit in 1933. The isolation of adult patients with uncomplicated scarlet fever was decreased by 30 per cent, compared with former practice. Control of the disease was equally satisfactory, judged by the attack rate among contacts and the infecting case rate of convalescent patients. The economic advantage of saving no more than a single week for the thousands of patients with scarlet fever is material.

These experiences in isolation, in the reporting of the disease, and in its communicability, suggest pertinently the development of an altered prescription for satisfactory administrative control of scarlet fever. Such a program should give greater emphasis to home isolation, but provide for adequate hospital care when circumstances are otherwise unfavorable or there is medical need. Hospital isolation should be as brief as possible, consistent with the condition of the patient and the safety of susceptible children at home.

These modifications should be correlated with the type of scarlet fever present. It is probable that in mild climates the restrictions might be reduced further than in temperate climates. When the disease is severe in character, longer periods of isolation may be required.

If much of an improvement is to be expected from isolation as a control measure in scarlet fever it is essential that it be instituted earlier. The present objective is not so much a shortened

isolation time, as one applied earlier and, under home conditions, much more rigorously administered during the period of greatest communicability, the first week. This should make possible an appreciable decrease in the time that patients with scarlet fever are now isolated.

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Annual Conference of the New England Health Education Association

THE meetings will be held on Friday afternoon and Saturday, June 1 and 2, at the Massachusetts Institute of Technology, Cambridge. Friday afternoon will be given to inspection of the exhibit put on by cooperating agencies to illustrate methods and materials for teaching health. Mrs. Clair E. Turner will be hostess at afternoon tea.

At the informal supper meeting for members of the Association on Friday evening, Miss Frances Stern, Chief of the Food Clinic of the Boston Dispensary, will speak on "What the Food Clinic Does for the Child," and Miss Mabel C. Bragg, Assistant Professor of Education in the School of Education, Boston University, will discuss and demonstrate the art of story telling. Students in the Fine Arts Course in Framingham Teachers' College will present a puppet play.

In the Saturday sessions, open to the

public, Dr. Wilson G. Smillie, Professor of Public Health Administration in the School of Public Health, Harvard University, will give an account of the present stage of research into the cause of the common cold, and Professor Eduard C. Lindeman, of the New York School of Social Science, will talk on adult health education.

The Honorable Herbert A. Parsons will preside at the Saturday luncheon at the Walker Memorial Building, introducing Dr. S. Monroe Graves, Superintendent of Schools, Wellesley, who will give an account of the work of the State Committee, of which he was Chairman, and which prepared the Teachers' Manual, recently published on The Effects of Alcohol, Stimulants and Narcotics on the Human System.

The program promises to be of great interest and help to educators and health workers. The program, giving details, will soon be available in print.

Evidence that *B. Alkalescens* (Andrewes) May Be a Variant of *B. Typhosus**

Preliminary Report

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EVERYONE affiliated with a public health laboratory has been confronted by the problem of identifying microorganisms which in many, but not all, of their properties conform to a recognized pathogenic species. When, as in this study, a certain type of culture is found repeatedly under similar circumstances, a special effort to determine its significance seems important. Strains of microorganisms having the properties of *B. alkalescens* have been isolated from approximately 1 per cent of the specimens submitted to the New York State Laboratory at Albany for bacteriological examination for members of the enteric-disease group.

In 1918, Andrewes¹ designated as *B. alkalescens* a species which he described as "an organism simulating Flexner's bacillus but fermenting dulcitate and producing alkali with much vigor." He believed it to be nonpathogenic. In 1928, Smith and Fraser² reported the isolation of *B. alkalescens* from 3 specimens of blood, as well as from the feces and urine of a patient whose symptoms were given as chills, pyrexia, grossly distended abdomen, diarrhea, and marked generalized icterus. Weil³ isolated this microorganism from the urine, and be-

lieved it to be the incitant, in a case of cystopyelitis. Popoff⁴ reported an interesting case of pyelonephritis apparently due to infection with *B. alkalescens*. Mackenzie⁵ of Montreal, at the meeting of the American Association of Genito-Urinary Surgeons in May, 1933, discussed the isolation of *B. alkalescens* from the blood of a patient having symptoms of typhoid fever and evidence also of pyelonephritis.

The strains designated as *B. alkalescens* are Gram-negative, nonmotile bacilli. Neither capsules nor flagella have been demonstrated. They develop readily on infusion and extract agar, producing smooth, colorless, convex colonies, with entire edges, somewhat less translucent and heavier than those of typical typhoid bacilli. On Endo's medium and eosin methylene-blue agar, the colonies may have very small red and blue centers, respectively. Their growth is usually inhibited on brilliant-green agar. The other characteristics in which they differ from *B. typhosus* are: the formation of acid in media containing rhamnose and dulcitol, the production of indol, and a definite alkaline reaction in litmus milk following an initial acidity. The reaction in double-sugar medium is the same as that of *B. typhosus* or *B. dysenteriae*; that is, acid forms in the butt and the slant is colorless.

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In a study of the serological reactions, no appreciable agglutination in typhoid antiserum has been obtained with strains having the properties of *B. alkalescens*. It may be of significance that this is the first property to be lost in the case of strains of *B. typhosus* grown in broth containing typhoid antiserum.⁶ Sera from rabbits immunized with *B. alkalescens* have given very irregular agglutination in tests performed with living cultures, but have consistently agglutinated alcohol treated suspensions of strains of the homologous species. Similar reactions have been obtained with precipitation tests. The alcohol treated suspensions of *B. alkalescens* are also agglutinated in polyvalent dysentery antiserum. A further study of this phase of the problem is planned.

Most of the characteristics of *B. alkalescens* have been observed individually in certain otherwise typical cultures of *B. typhosus*. Nonmotile strains of the latter, although extremely rare, have probably been encountered by most bacteriologists who have examined large series of specimens from patients with typhoid fever. Strains which are inagglutinable, at least when freshly isolated, are more frequently found. Flexner,⁷ in 1894, reported a so-called "blue" strain of *B. typhosus* which, after preliminary formation of acid, produced a marked alkaline reaction in litmus milk. Penfold^{8,9} found that *B. typhosus* may be induced to ferment rhamnose and dulcitol by cultivation in media containing these carbohydrates. The production of indol by certain cultures belonging to this species has been reported by Peckham.¹⁰ The results⁶ of experiments which as yet we have been unable to confirm, indicate that certain strains of *B. typhosus* cultivated in medium containing typhoid antiserum may assume the biochemical and antigenic properties of *B. alkalescens*.

The infrequency with which *B. alkalescens* is isolated warrants the assumption that this species is rarely present in the intestinal flora. During the period January 1, 1931, to July 1, 1933, in the examination of 10,747 specimens of feces, urine, and blood for *B. typhosus* and other incitants of enteric disease, cultures having the properties of *B. alkalescens* were found in 119 specimens from 49 persons; they were isolated from both feces and urine, but have not as yet been obtained from blood. In addition to the strains which we isolated, 15 cultures were sent to us for identification by directors of other laboratories in New York State. Twenty-nine of the individuals from whose specimens this species was obtained had, or were convalescent from, typhoid fever; 13 others had gastroenteritis. (These 2 groups include 65 per cent of the 64 persons represented.) Two were carriers of *B. typhosus* and 17, 4 of whom had a history of enteric disease—probably typhoid fever—were being examined for evidence of the carrier condition. One of the 3 remaining patients had cystitis, and pertinent data did not accompany the specimens from the other 2. In 5 instances, these microorganisms were found in specimens from 2 or more individuals in the same family. In 5 other cases, when this species and no typhoid bacilli were found in specimens from patients with, or recovering from, typhoid fever, *B. typhosus* was isolated from specimens from other members of the same household who were ill or who had had typhoid fever within a period of a few months.

Pertinent information concerning 8 of the typhoid fever patients, which has been summarized in Chart I, seems of interest. Cultures of both *B. typhosus* and *B. alkalescens* were isolated from specimens from these individuals. The 8th case is of particular interest since it represents a laboratory infection.

CHART

PATIENTS WITH, OR RECOVERING FROM, TYPHOID FEVER FROM WHOSE FECES
BOTH *B. TYPHOSUS* AND *B. ALKALESCENS* WERE ISOLATED

CASE NUMBER	AGE	SEX	WEEK OF ILLNESS IN WHICH SPECIMENS WERE EXAMINED											
			1	2	3	4	5	6	7	8	9	10 TO 25	LATER	
1	6	M		●	● ○	○ ○ ▲	▲							
2	29	M		▲	▲		○	▲ ○ ○	○ ○ ○					
3	5	F			●				○	▲	▲	○		
4	23	M		● ● ○		▲	▲ ▲	▲ ○	○	○	○			
5	9	M		●						○	○	▲ ▲ ▲	▲ ○ ○ ○	
6	10	M	▲		●					○	○	○		
7	14	M		●	●	▲	○ ▲ ▲ ▲ ▲	○ ○ ○ ○						
8	30	F		▲	● ● ●	● ▲ ○	▲ ○ ▲	○ ▲ ○	○ ○					

● *B. TYPHOSUS* ISOLATED
▲ *B. ALKALESCENS* ISOLATED
○ NEITHER ISOLATED

The patient had been handling cultures of both species. Although typhoid bacilli were readily obtained from this patient's blood during the first 2 weeks of illness, they were isolated with difficulty from the early fecal specimens, while *B. alkalescens* was apparently present in relatively large numbers. Later, both types were numerous, and, finally, neither was found. ...The significance of *B. alkalescens* in this case can only be conjectured. Its presence previous to the illness is unlikely, since it persisted and disappeared at practically the same time as the typhoid bacilli. One of 2 conclusions is suggested: a strain of *B. alkalescens* may have been the incitant, which, after entering the body, developed into a true typhoid bacillus, or, if *B. typhosus* were ingested, the other species may have been its variant.

SUMMARY AND CONCLUSIONS

It has been shown that strains of bacteria having the properties of *B. alkalescens* are present in approximately 1 per cent of all specimens submitted for bacteriological examination for evi-

dence of enteric disease. Clinical and epidemiological data suggest a close relationship to the typhoid bacillus.

In the study of specimens from patients recovering from typhoid fever and in the search for carriers, the presence of this type of microorganism seems of special import. Even though, in itself, it may have no pathogenic significance, the fact that in so many instances *B. typhosus* has been isolated from the same or other specimens from the individual concerned, makes a thorough search for this microorganism imperative, whenever strains of *B. alkalescens* are found. When suspected typhoid carriers are concerned, it would seem very important to examine a large series of fecal specimens and, if possible, duodenal contents.

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Practical Method for Public Health Laboratory Diagnosis of Infectious Syphilis*

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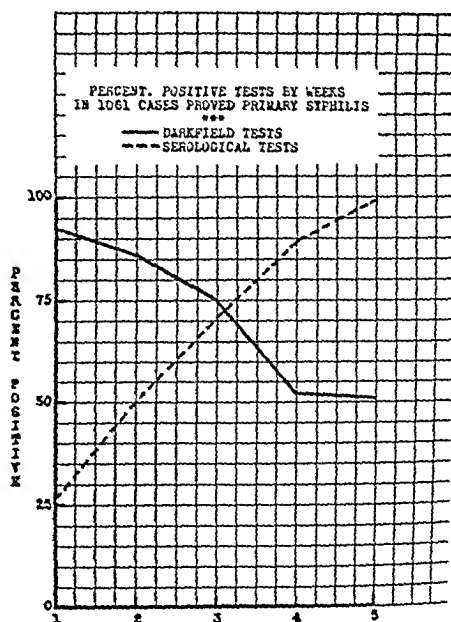
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PRE-WASSERMANN diagnosis of syphilis is of great value from at least two standpoints. First, as has been repeatedly pointed out by venereologists, an early diagnosis followed by adequate treatment offers the patient the greatest possibility of complete cure—the so-called “abortive cure.” Second, from the public health point of view, the sooner a case of syphilis is diagnosed and reported, the more efficiently can the health department apply its supervisory control.

A graph (Figure I) prepared from percentages reported by Owen and Cope¹ on 1,061 proved cases of primary syphilis gives a good index of the superiority of the darkfield test over serological tests. It will be seen that the latter tests do not equal the darkfield method in efficiency until the third week of the disease.

Other tests on secretions from sus-

pected lesions are either unreliable, unsatisfactory, or impractical for one reason or another. Fortunately the practice of making a diagnosis from the clinical appearance of a sore has been shown to be so unreliable that it has



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been abandoned. Among the remaining methods applicable to chancre secretions are stained preparations, contrast methods, or serological tests. Preparations in which material from the suspected chancre is smeared on slides or cover-slips for the detection of *Treponema pallida* by means of stains are definitely inferior to the darkfield test. The organisms are usually distorted in the smearing and drying process, and if a silver impregnation method is used, there is further swelling and distortion of the actual appearance of the organisms. India ink contrast preparations require considerable skill, and if one has in mind the sending of chancre fluid to a laboratory for this purpose, it would be more satisfactory to use the fluid in a darkfield test. Because of the earlier local development of reacting substances, it is possible to utilize chancre fluid in complement fixation or precipitation tests. The technical difficulties involved in the collection and sending of enough suitable fluid for this purpose are such as to make this method impractical.

Undoubtedly the best conditions for the darkfield examination of lesions suspected of being syphilitic are those in which the patient goes to a laboratory or special venereal clinic and remains until satisfactory test material has been examined. The material is freshly collected by an experienced worker and the patient is available if retests on more of the secretions are desired. There is, however, a large field for a test which would be available to physicians practising in rural communities and in small towns where there are no laboratory facilities. Also patients unable to pay for the services of a venereal specialist and unwilling to go to free clinics and dispensaries would benefit by a test which could be collected in the doctor's office and mailed to a state or municipal laboratory. Such a service should be offered by public health or-

ganizations because the early diagnosis of syphilis is distinctly in the field of preventive medicine.

Mahoney and Bryant,² experimenting with material from rabbits and also from human lesions, found that recognizable treponema persisted in collected specimens for 4 to 5 days in most cases. They used straight capillary tubes, filling them by capillarity and sealing with a paraffin-vaseline mixture. A progressive decline in motility of the organisms was the usual finding in the collected material. Temperature of storage was an important factor, they found; tubes kept at higher temperatures became unsuitable or negative in darkfield tests sooner than those kept at lower temperatures. This was interpreted as being due to the effect of the bacterial over-growth which was more pronounced at the higher temperatures.

Our efforts have been directed toward the development of a method which will permit of the collection of serum from chancres in such a manner as to afford optimum conditions for the survival of recognizable treponema. The method must be simple enough to be readily understood and the completed package must be such as to withstand rough handling in the mail. Postal laws and regulations also had to be taken into consideration.

An outfit which has been satisfactory in our hands, and which has been approved by the district supervisor of parcel post, consists of a one-piece stamped iron box, 6.5 x 2.5 x 1 cm. with a slip-cover to fit; paraffin-vaseline mixture, capillary tubes, identification card, and the usual screw top mailing tube. The capillary tubes are 5 cm. long and of about the same thickness and bore as the tubes in which smallpox lymph is ordinarily dispensed. Three of these capillaries are sent out in each outfit, placed in a small glass test tube, with cork stopper for protection against breakage. The small iron boxes are

half filled with the paraffin-vaseline mixture which is then allowed to harden. The percentage of paraffin is varied to suit the seasonal variation in temperature—approximately 10 per cent paraffin is suitable for all but the hottest weather.

To fill the capillary tubes, the doctor secures an exudation of clear serum on the lesion and applies one end of the fine tube to the fluid. We recommend holding the capillary in a horizontal position for assisting the capillary flow, and also request the filling of more than one tube as a safeguard against drying which occasionally takes place. When the specimens have been taken into the tubes, the latter are placed on the surface of the grease in the box and gently pressed beneath the surface. This seals both ends of the capillaries and at the same time provides support and protection for them in transit.

To examine the specimens at the laboratory, the tubes are removed from the grease with forceps and the contents expelled by repeatedly pressing one end of the tube into a stiffer paraffin-vaseline mixture until the fluid is driven out of the other end of the capillary onto the darkfield slide. A point of practical value, in the laboratory at the time of preparing the slides, is to allow a small amount of the grease which adheres to the capillary to drop on the slide. This serves to anchor the cover-slip at the center and to prevent sudden currents in the preparation under the microscope.

Through the coöperation of two venereal clinics in Chicago, we have received known positive material from cases of primary syphilis. These specimens were sent by mail so that the effect of such handling would also enter into the trial of the method. Additional advantages in this arrangement were that the time of placing the specimens in the capillary tubes was known and also the approximate abundance or

scarcity of treponema was in most cases indicated on the information card.

The results of these preliminary tests may be summarized briefly by tabulation (Table I).

TABLE I

RESULTS OF DELAYED DARKFIELD TESTS				
Days elapsd	No. of Specimens	Positive	Negative	Dried-Out
1	57	56	1	0
2	42	35	5	2
3	14	12	0	2
5	1	1	0	0
6	1	0	1	0
Totals	115	104	7	4

Of the total of 115 examinations, 104 or 90 per cent were found to be positive after 1 to 3 days from the time of collection. Two specimens were delayed in transit and were received 5 and 6 days after the material was collected. The first of these was still positive, but the 6 day old sample was negative. The specimens which dried out in transit did so because the capillary tubes were not forced below the surface of the paraffin-vaseline mixture.

A positive diagnosis in this series of tests was based on the presence of treponema of characteristic form. As reported by Mahoney and Bryant, we noted in general a progressive decline in motility. This question of motility was not a perfectly regular function of the age of the specimens, however. Many of the 1 day old tubes contained organisms which were non-motile, and occasionally actively motile forms were found in 2 and 3 day old specimens; but the usual experience was that motility decreased with age.

The presence of other spiral organisms was noted in many of these specimens, but they did not interfere with the survival of *Treponema pallida* in a recognizable form. Too many red blood cells in a darkfield preparation render the examination difficult, but it

is our impression that there was better preservation of motility and form in specimens which contained a few to a moderate number of red cells. Whether this was accomplished through the production of a more favorable oxygen tension or whether it was due to other causes is not known. In the routine use of this delayed darkfield test, it should be especially emphasized that a negative finding does not exclude syphilis in the patient. Retests are indicated on all negative results.

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Our Changing Diet

OF all the midnight marsh glows that civilized or semicivilized man has followed in his pursuit of the true light that would lead to complete and permanent health, the most have been built about his diet. True, his diet has changed as he and his environment have changed, and certainly not always for the better. The focus has shifted from calories to ash and from ash to vitamins, and has rested on those mysterious substances to be found in liver and the gastric glands, until it has seemed almost as if the lowly tripe were at last to come into its own.

From the wheat lands has come a

pacan of glory in favor of crumbled toasties, and from the plantations of the citrus growers a trumpet note has sounded the knell of acidosis. Still, it must be believed, we are coming nearer to a true understanding of the metabolism of digestion; of man's wants and of the deficiencies which he has imposed upon himself. We are realizing at last that those foods which are nearest at hand, which are most edible in their natural state and which require the least preparation and processing are the best suited to our needs.—Joseph Garland, Dental Health. *New Eng. J. Med.*, Mar. 15, 1934, p. 570.

Standard Methods and New Procedures for the Isolation of Colon Bacilli from Water*

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THE isolation of *B. coli* † from water dates back at least to the work of Theobald Smith (1893) 40 years ago. Glucose broth was used at first but later it appeared that lactose broth was preferable since it cut out many forms unrelated to the colon group which ferment glucose but not lactose. In the second edition of *Standard Methods* (1912) a lactose-bile presumptive test was recommended for the "colon group" as a whole; and preliminary cultivation in glucose or lactose broth with isolation on litmus-lactose-agar and identification by various tests, for *B. coli* itself. In the third edition (*Standard Methods*, 1917) there was outlined the procedure which has been essentially followed up to the present day.

This procedure as set forth 16 years ago involved the inoculation of lactose broth fermentation tubes as a presumptive test with plating on Endo medium or litmus-lactose-agar as a partially confirmed test and with isolation of pure cultures and testing for

lactose fermentation and morphology as essential for a completed test. In the fifth edition (*Standard Methods*, 1923) eosin-methylene-blue was substituted for litmus-lactose-agar as an alternative to Endo medium for plating from positive lactose-broth presumptive tests. Otherwise no change was made in basic procedure until the present year. From 1917 to 1933 it was allowable to perform the lactose-broth presumptive test only, in routine examination of raw waters in connection with control of the operation of purification plants and the partially confirmed test only "in the routine examination of water supplies where a sufficient number of prior examinations have established a satisfactory index of the accuracy and significance of this test in terms of the completed test."

Meanwhile numerous efforts had been made to replace lactose broth by some medium which would be so specifically adapted to *B. coli*, and to this organism alone, that a single test for gas formation might serve as the final criterion of its presence. Among the earlier procedures were the use of bile media, of phenol broth, of media containing neutral red, of aesculin media, of liver broth and cultivation at 46° C. References to these earlier studies are given in detail by Prescott and Winslow (1931). Most of them have been abandoned; but the Eijkman test (in-

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† Throughout this paper the term "*B. coli*" is used for the entire colon group, including both *Escherichia* and *Aerobacter*. The differentiation between these two forms is not here considered though it has very real importance. Parr and Caldwell (1933) found that the organisms cut out by the use of brilliant-green bile were chiefly of the *Aerobacter* type.

volving cultivation at 46° C.) has recently been studied by Leiter (1929), Brown and Skinner (1930), and Perry and Hajna (1933); and bile still plays a part in some of the more recent media.

The possibility of utilizing inhibitive dyes in selective media for the isolation of *B. coli* received a powerful impetus from the work of Hall and Ellefson (1918) with gentian violet. Bronfenbrenner, Schlesinger and Soletsky (1920) suggested the use of rosolic acid and Muer and Harris (1920) that of brilliant green. Dunham, McCrady and Jordan (1925) and Jordan (1927) obtained good results with a medium containing both brilliant green and ox gall. Both reported over 90 per cent correlation with the standard procedure. Noble (1928) developed an agar medium containing potassium ferrocyanide, ferric citrate, fuchsin and sodium sulphite. Salle (1929, 1930) experimented with crystal violet and Dominick and Lauter (1929), Salle (1930), and Leahy (1930) with brom-cresol-purple media. Ritter (1932) reported highly encouraging results from Kansas with standard lactose plus 0.8 c.c. per liter of saturated alcoholic basic fuchsin. Out of 33,532 positive presumptive tests in this medium, over 94 per cent were confirmed as *B. coli*. In a series of 533 samples run in parallel the average coli index after confirmation was essentially the same in both media; 17 per cent of the samples showed a higher index in standard broth, 16 per cent a higher index in fuchsin broth. Jordan (1932), a year ago, presented a review of the brilliant green procedure which led to a stimulating discussion.

As a result of all this agitation the Committee on Standard Methods in its seventh edition at last recognized that something had happened since 1917. It provided (*Standard Methods*, 1933) that for "unfinished waters," duplicate inoculation into lactose broth and

brilliant-green bile might be employed, with transfer to a secondary tube of brilliant-green bile from any positive primary lactose tube paralleled by a negative primary brilliant-green bile tube. This shortens the test time to between 24 and 96 hours for this class of waters. It is still permissible to rely on a presumptive lactose broth test alone in the case of raw waters subject to purification processes; and it is still necessary to follow out the old routine of isolation and identification for all waters assumed to be potable.

During the past 6 months several important new contributions to this subject have appeared. Nolte and Kramer at St. Louis (1933) found Noble's cyanide-citrate agar unsatisfactory; but Dominick and Lauter's methylene-blue brom-cresol-purple broth gave admirable results. Less than 5 per cent of the lactose-broth presumptives were confirmed as compared with over 76 per cent of the Dominick and Lauter presumptive tests. Furthermore, the Dominick and Lauter medium yielded more confirmed positive isolations than the standard lactose medium (11.4 per cent against 8.9 per cent for unfinished waters and 1.1 per cent against 0.9 per cent for finished waters).

Butterfield (1933), on the other hand, takes a vigorous stand against the use of simplified methods except as permitted by the new edition of *Standard Methods*. He reports new data (for Cincinnati waters) showing that brilliant-green bile gave only 84-90 per cent of the final completions obtained with *Standard Methods* on raw waters and only 35-37 per cent with finished waters. The Dominick-Lauter method was even more unsatisfactory. Butterfield then analyzes the results presented by Jordan (1927) and shows that while on the average for all samples brilliant-green bile (with 2 per cent ox gall) used as a complete test,

gave over 80 per cent of the completed positive tests yielded by *Standard Methods*, the proportion fell to 56 per cent for one source (Cincinnati). Only one other source, however, fell below 70 per cent. The apparent difference between Butterfield's results and those reported by others is, of course, due to the fact that he computes his results in per cent of Standard Method-positives, which are also brilliant-green-bile positive, while most summaries have presented merely the per cent of all samples positive by each of the two methods. Thus, if lactose broth shows 8 per cent of samples positive with lactose broth and 4 per cent with lactose bile, most reports would suggest a close agreement (92 per cent negative by both tests, 4 per cent positive by both tests, 4 per cent divergence). Butterfield would say that the method showing 4 per cent positives was 50 per cent in error.

Still more recently Stewart (1933) has reported favorably on the Dominick-Lauter method, and Parr and Caldwell (1933) have presented a new study of brilliant-green bile. Full data are given for 1,407 samples with the following results: Lactose-broth presumptive tests were positive for 82 per cent of all samples while only 43 per cent of the primary brilliant-green bile tubes were positive. Colon bacilli were confirmed after lactose-broth enrichment in 32 per cent of all samples, after brilliant-green bile enrichment in 24 per cent of all samples. Thus, if the confirmation according to *Standard Methods* be taken as a norm, the brilliant-green presumptive gave, in this instance, results which were 23 per cent too low. These samples (for Alabama wells) contained a large number of anaerobic organisms producing a false-positive reaction in brilliant-green bile.

We may summarize the general situation by saying that the brilliant-green bile medium (which has been most exhaustively studied), when used without

any confirmatory procedure, gives us on the average about four-fifths as many positive results as the *Standard Methods* with complete confirmation. Media employing crystal violet, basic fuchsin and, particularly, brom-cresol-purple have also yielded highly encouraging results.

If this were the whole story, the argument for adopting a simplified procedure would be practically conclusive. It sounds impressive to say that the brilliant-green bile test yields only three-quarters or half as many positive results as *Standard Methods*; but such a difference as this has no very great practical significance when interpreted from a practical quantitative standpoint. No sanitarian can rationally condemn a water which shows 8 per cent positive results, and pass one which shows 4 per cent. Actually, of course, we work in powers of 10 in making our dilutions, and even such extreme variations as those recorded by Butterfield would only influence one's decision in a few borderline cases. The loss of one-fifth of the colon bacilli present could not conceivably have any real influence on the practical conclusions to be drawn.

Furthermore, if there were even a greater difference than anyone has suggested, this difference—if it were reasonably uniform—could be allowed for by a change in standards of interpretation. Neither the colon test nor the Treasury Department Standards form part of any law handed down on tables of stone from Sinai. If it seemed more convenient to use a procedure which gave only half as many colon bacilli as the present *Standard Methods* we could quite easily set a limit of one positive 10 c.c. portion in 20 (instead of 1 in 10) as our limit of safety.

The only aspect of the situation which gives one pause is the possibility that marked and really significant differences may exist between different

waters. If it be true that Cincinnati treated waters tested with brilliant-green bile show only 35 per cent as many positives as *Standard Methods*, while with other waters the ratio rises to nearly 100 per cent, the problem is more serious.

Even so, however, the question is by no means closed. We need to know the reason for the differences. Does the Cincinnati treated water contain a large proportion of attenuated colon bacilli which are really of slight sanitary significance? Do the Alabama wells contain anaerobic spore-formers of the *Cl. Welchii* type, which may be much more important than attenuated *Esch. coli*?

We have used the colon test in its standardized form so long that it has become something sacred and untouchable; and that is always a dangerous frame of mind smacking of religion rather than of science. Let us remember that this is a test devised by plain human beings like ourselves and that it was designed to differentiate between safe and unsafe water supplies. The colon bacillus in itself has no inherent significance except as an index of sanitary quality. The isolation of all the colon bacilli present is of no importance except as an index of sanitary quality. What we want is a test which shows the greatest possible difference between good waters and bad waters; and that is all we want. It is quite possible that where the newer bile-dye media yield results different from those of *Standard Methods*, they may be more significant than *Standard Methods* and not less. They appear to give higher results with more polluted waters, and lower results with less polluted waters, which is exactly what we want in a yardstick of this kind.

The standard procedure for isolating *B. coli* has two serious defects. In the first place, it permits the use of lactose-broth fermentation as a final and com-

plete test for raw waters in connection with the operation of purification plants. This is a test which yields results which are often far too high, since certain waters rather regularly contain spore-formers or combinations of symbiotic organisms which are of no sanitary significance but yield positive results. Thus, the efficiency of purification processes is greatly overestimated.

In the second place, *Standard Methods* requires for all waters in a potable state the old complex process of isolation and identification which consumes 6 or 7 days and an enormous amount of time and materials. The procedure was the best available in 1917. It seems to the writer to be archaic and indefensible in 1933.

There seem to be two possible alternatives which are clearly suggested by the progress made in the study of new methods during the past 10 years. The first of these alternatives is the use of simultaneous inoculation into lactose broth and brilliant-green bile with secondary inoculation into brilliant-green bile from positive primary lactose tubes paralleled by negative primary brilliant-green bile tubes. This is the procedure now permitted for unfinished waters; but there seems no valid reason why this type of procedure should not be accepted for all classes of waters. Even Butterfield's analysis shows that this procedure yields on the average 95 per cent of the positive results obtained by *Standard Methods*. He is disturbed by the fact that in results from 4 out of 15 cities the ratio falls below 90 per cent—the figures being 89 per cent for Omaha, 87 per cent for Indianapolis, 86 per cent for Montreal, and 71 per cent for Chicago. It is really difficult to see how such results can be considered as unsatisfactory if one lifts his eyes for a moment from the laboratory table and considers what the colon test really means, the actual uses to which it is put, and the limits of accuracy

within which it can conceivably be interpreted.

Personally, I hope and believe it should be possible to go even further than the general adoption for all waters of the double inoculation into lactose broth and brilliant-green bile. There are several of the new tests (particularly the brilliant-green-bile and brom-cresol-purple media) which seem to offer excellent promise of a single primary fermentation test which could be accepted as final for all classes of waters. For supplies from most regions it seems possible by such procedures to obtain four-fifths as many colon bacilli as by the use of *Standard Methods*; and such a result is well within the range of practical interpretation.

The fact that certain waters when tested by such procedures show divergent results, some higher than when tested by *Standard Methods*, some considerably lower, may be a real disadvantage. On the other hand, it may be an advantage. The use of lactose-broth tubes followed by isolation and identification has, after all, no Divine sanction. It may be that the newer procedures correspond more closely than the old ones to actual sanitary conditions.

My plea is for a fundamental re-examination of this whole problem with an open mind, and with a clear view of the practical results to be obtained, and of the margin of error associated with their interpretation. The pressing need for economy and efficiency makes such a re-examination peculiarly imperative at the present time. If we can cut down the cost of an examination we can make more examinations; and a fuller measure of control should vastly outweigh any 5 or 10 per cent loss in accuracy.

I would therefore urge upon the Laboratory Section the adoption of definite steps along somewhat the following lines.

1. The bacteriologists associated with the Standard Methods Committee should first make a preliminary survey of the field and select three or four of the most promising of the new procedures (such as the use of brilliant-green bile, brom-cresol-purple, crystal violet and basic fuchsin media or cultivation at 46°). The methods selected should include 1 or 2 which involve the use of a single confirmatory medium following lactose-broth fermentation, and 1 or 2 which involve the use of a single primary selective medium by itself.

2. A considerable group of collaborators should be enlisted to make comparative tests of water samples from various sections of the country, raw waters and finished waters, filtered and chlorinated waters, well waters and surface waters. These collaborators should employ for each sample: (a) *Standard Methods* with full confirmation, (b) one or more methods employing a single confirmatory test following lactose-broth fermentation, and (c) one or more methods employing a single primary fermentation test alone. The work involved need not be very great. For instance, each sample might be inoculated into lactose-broth, brilliant-green-bile and brom-cresol-purple broth. All positive lactose-broth cultures which were negative in either of the other media should be inoculated into a secondary tube of that medium; and all positive lactose-broth cultures should be followed through by *Standard Methods*. The procedure set forth by the central committee for each test should be strictly followed. Records of sanitary inspection should be available to give an idea of the probable sanitary quality of each water.

3. The Central Committee of Bacteriologists associated with the Committee on Standard Methods should assemble all results, and compute comparative averages in various ways for

various classes of waters. Those waters which yield markedly divergent results by various methods should then be studied in detail by obtaining data as to their real sanitary quality.

Such a program, if vigorously prosecuted, should make it possible in 2 years' time to arrive at reasonably definitive results. I believe it would open the way to new *Standard Methods*, in accord with the recent progress in water bacteriology, and not only more efficient and more economical but more significant than those now employed.

The Laboratory Section is the logical body to take such a step. If it fails to do so, some other group is likely to take the initiative, for, to many of us, the present situation seems well nigh intolerable.

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DISCUSSION

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AT the 1932 meeting of this Section I had the opportunity to say a few words on the merits of the MB-BCP medium, which I wish to discuss more fully. I am looking at the isolation of the colon-aerogenes group in

water works practice, purely as a laboratory worker and representative of the thousands of water works laboratories and superintendents where the bacteriological analysis of the processed water is necessarily only a part of the

daily duties of the filter plant operator, and as one who has tried the lactose broth routine and has found it wanting.

Accuracy and detail should not be sacrificed to gain time. It was with this point in mind that Hale, of New York, advocated so long the brilliant bile medium upon which an extensive series of studies was done under the leadership of Mr. McCrady, our chairman. This was followed by the work of Jordan, of Indianapolis, and has resulted in the use of a final or confirmation tube of brilliant-green bile being allowed in the 1933 edition of *Standard Methods* as an alternate method.

The work in our laboratory for the past 5 years has been chiefly devoted to the use and development of the MB-BCP medium, which is being run in parallel with standard lactose broth on a large part of our daily routine samples.

The 3 series given on the table were made on 52,000 tubes, over a period of 18 months, on 3 distinct classes of water, namely, raw or river and coagulated; filtered without chlorination; and chlorinated filter effluent.

There are 3 distinct sets, each using a variation of the medium as follows: Series "A" was made on a dehydrated medium according to the first formula used, designated A in table. Series "B" was also a dehydrated medium, in which the dye content was cut, but in which the beef extract was also cut to a very low point. Series "C" is the same as "B," with 5 gm. of beef extract and .025 gm. methylene-blue per liter added to enrich it and prevent, if possible, some of the losses encountered in "B."

The results have been enumerated separately on each class of water and then taken collectively for each group. It is evident that "A" is good, "B" less efficient in recovery than "A," and "C" almost perfect, that is, from the standpoint of standard lactose performance.

The lactose broth tubes were all confirmed in accordance with *Standard Methods*, and the MB-BCP for a great part was confirmed in the same manner, although this was dispensed with for a while, as results of over 1,000 tubes showed better than 99 per cent confirmations on all types and dilutions where gas was formed in 24 or 48 hours.

If we grant that we lost 1 tube in Series "C" in the 1 ml. dilutions over 4 months, and 1 tube after 6 months, we might argue that the medium is defective; yet we have a gain in the 10 ml. portions at other times, thus manifesting its superiority, and indicating that at least a part of the losses in the 1 ml. dilutions are due to distribution of a few organisms present over the range of the tubes made.

Of what significance is the loss of 1 tube in any water over 4 months, when in the raw water we are able to pick up more tubes in both 1 and 10 ml. dilutions, and in also 0.1 ml., which is not here shown. Most of these show gas on the first day, and the plant operator, be he a chemist, bacteriologist, or engineer, can easily see gas formation and the accompanying color change and draw his conclusions almost before the water leaves his plant.

We do not claim to have found an infallible means of differentiating *Escherichia coli* from *Acrobacter aerogenes*, but do feel that it is something that can be used by a trained scientist and an unskilled plant operator with practically the same efficiency and within a time which will allow the use of the results before the water is used by the consumer.

This latter claim has been verified a number of times in our city in the case of outlying reservoirs where the colon-aerogenes group was detected in 24 hours in normally colon-free water, treated and rectified, after which we were notified by other sources that the group existed in this reservoir.

In addition to the MB-BCP we also ran a great number of 2 per cent BGB tests in parallel.

We were at a loss to explain the poor efficiency of this 2 per cent BGB as we had been getting almost parallel results with lactose broth in the past. The 5 other BGB figures were on Special BGB 2 per cent media, of varying brilliant-green concentration, kindly furnished by Mr. Dunham of the Difco Laboratories. Little has been done on this medium for the past 6 months as we felt that the MB-BCP has a slight edge on it and certainly was better than lactose.

The color reaction is a big thing in its favor and from this alone one can get some idea of the recency of pollution or degree of attenuation. The reaction goes from blue, to purple, pink, orange, yellow, then to green. The last two are practically always accompanied by gas in 24 hours or less, although 48-hour tubes will also show this color.

Those organisms very strongly attenuated may take 48 hours to give gas and the medium is generally pink in color. Negative tubes remain blue or purple or sometimes pink, but with no gas.

It is on the following point that most of the criticism may arise. In pure culture work, a medium, designed to do a certain thing for natural waters, will not function 100 per cent, nor is it necessary that it should. In pure cultures the organisms used are not typical of those encountered in the water sample:

1. Because they have had a different environment. In the filtered-chlorinated water they have resisted the attack of several tenths p.p.m. of chlorine and are therefore less able to overcome the inhibitory effect of the dyes in the medium, than in their revived state.

2. The concentration used in pure

culture is often many times the amount that is encountered in the water sample. Therefore, the dyes necessary to inhibit the pure culture laboratory strain and concentration must be greater than the amount necessary to inhibit those met with in practice. This is shown in our own laboratory, where it has been found that a certain strain of an aerobic, Gram-negative, lactose splitter will not give a positive reaction on MB-BCP medium, although positive in standard lactose broth. It will, however, give a beautiful positive reaction when introduced in mass culture. There is obviously no means of comparison here.

The cost consideration should not escape us. These 3 series of runs were accounted for on the basis of dehydrated medium which was the material used, and eliminating the extra time required for making the EMB plates and the greater number of tubes of primary and secondary lactose tubes, we have:

Materials only, Standard Lactose	
Broth. Complete	\$159.00
Materials only, MB-BCP Medium.	
Complete	106.00

Thus we have a net saving on material *alone* of \$53 or 50 per cent of the cost of BCP. To a large laboratory this may and does mean a considerable item, and in addition the time saved will allow more valuable work to be done and more money spent in research for the ultimate discovery of the perfect medium for this elusive family of organisms.

Before concluding, I want to recall the work done on this media by Leahy and his associates, working at Rochester; Lieutenant Commander McCants of the U. S. Naval Medical School, where it is being used as the medium best adapted to the conditions of the Naval Service; Aug. G. Nolte at St. Louis; H. V. Stewart, Director of

THREE SERIES OF COMPARATIVE RUNS ON STANDARD LACTOSE BROTH AND METHYLENE BLUE BROM CRESOL PURPLE MEDIUM

These tests are the daily routine of the Dalecarlia Filter Plant, Washington, D. C., from Feb., 1932, to Aug., 1933

*Standard Methods Lactose Broth,
A.P.H.A. 1932*

	No. of tubes each dilution	Presumptive 24 & 48 hr.		Confirmed— emb. & tube		MB-BCP Dehyd. Direct inoculations		Percentage BCP Gas to Lactose Conf.	
		10.0 ml.	1.0 ml.	10.0 ml.	1.0 ml.	10.0 ml.	1.0 ml.	10 ml.	1 ml.
<i>Series A. 8 mos. Orig. dehydtd.</i>									
Raw Water, 3 sources									
River and Coagulated	1,553	1,275	418	1,273	414	1,232	365	77	83
Filtered. No Cl.	639	130	0	43	0	57	0	130	100
Chlor. & Filtered	3,329	463	7	162	3	165	1	101	33
	5,521	1,877	425	1,478	417	1,454	366	98	88
<i>Series B. 6 mos. A cut in half</i>									
Raw Water, same	1,229	1,136	703	1,135	691	1,127	600	99	87
Filtered. No Chlor.	450	94	2	50	2	45	1	90	50
Chlor. & Filtered	2,656	224	0	62	0	58	1	93	Inf.
	4,335	1,454	705	1,247	693	1,230	602	98.5	86.5
<i>Series C. Same as B with 5 gm. beef ex. 4 mos.</i>									
Raw Water, same	785	736	345	735	337	741	351	101	104
Filtered. No Chlor.	306	60	5	27	5	29	4	107	80
Chlor. & Filtered	2,148	129	3	40	2	47	1	117	50
	3,239	925	353	802	344	817	356	102	103
Totals	13,095	4,256	1,483	3,527	1,454	3,501	1,324		

Compiled Sept. 27, 1933—C. J. Lauter

the Hygienic Laboratory at Little Rock, Ark., H. E. Jordan of Indianapolis, and Mr. Howard of Toronto, Canada.

Leahy, McCants, Nolte, Stewart, Jordan and Howard seem favorably inclined to this or some sort of rapid means of colon-aerogenes isolation, and have found the MB-BCP medium unexcelled by standard lactose broth. Mr. Dominick and I present this medium

as a substitute for the present lactose broth method, and for further study. We advocate its use as a "direct inoculation" medium, and that all gas in 24 and 48 hours be accepted in plant routine as positive for members of the colon-aerogenes group, thus developing an actual bacteriological control of the filtering process, instead of the present chemical control only.

HARRY E. JORDAN, F.A.P.H.A.

Filtration Engineer, Indianapolis Water Company, Indianapolis, Ind.

I HAVE the following comments to make upon the subject under discussion:

1. Variations in diagnostic procedure for coli-aerogenes group based upon stage of treatment of water are undesirable. The use of presumptive lactose alone on raw waters increases the apparent density of coli and by the application of the complete test to finished waters exaggerates the apparent efficiency of the purification process.

2. The use of inhibitive media for primary planting (to the exclusion of lactose broth) produces a deviation from previous data material enough to support the contention of conservatively minded that significant forms are being excluded. While I have a degree of sympathy with the contention of Dr. Winslow that we should reconstruct our interpretative procedure in terms produced by the simplified technic, I doubt that the gain is worth the argument it

would cause. One can easily assume that, in the case of the U. S. Treasury Standard, the per cent of 10 ml. positive portions could be reduced to 7 or 8 instead of the 10 per cent now allowed. I do not believe that many plants now complying with the standard would be discredited by the change. Performance among the majority appears to lie under 5 per cent positive findings as the water is delivered by the purification plant to the municipal distribution system. But until the Treasury Department through its Public Health Service indicates a desire to revise the present standard, standard laboratory procedure must continue to approximate the procedure set up in the Fifth (1923) Edition of *Standard Methods*. The necessity of coördination limits the present editorial committee to the promulgation of methods of evaluating coli-aerogenes density which will meet the requirement of statistical equivalence or approximation. Incidentally, this, along with various other reasons, would appear to raise the question of need of revision of the Treasury Standard.

3. I am firmly of the opinion that methods of determining coli-aerogenes group presence should be adapted to the production of more data regarding density of the group—especially in raw waters. Many laboratories do not examine enough portions of finished water to obtain a true density picture. There is not a treated surface water in America that does not contain organisms of the coli-aerogenes group, and they can be found if large enough quantities of the supply are examined. While it would not be practical to recommend the regular examination of enough water each day to produce a positive finding, a step can well be taken in that direction by the addition of 100 ml. portions to the finished water routine.

On the other hand, it is evident that relatively few plants are examining enough dilute samples on raw water to

produce a high enough density picture. This is especially true at times of high loading when the technician calculates coli density from a series of dilution tubes which are all positive in the highest dilution. Inasmuch as it is increasingly recognized that the character and degree of maximum loading is important, stress must be laid upon the need for obtaining reasonably accurate figures at such times. Since we must admit that few laboratories can assume new details without a compensating reduction in other demands, it appears doubly evident that reasonable simplification of coli-aerogenes identity technic is rational and much needed.

4. Out of all the discussion which has gone on for the past 10 years, it now appears that the planting of water samples into primary lactose broth tubes and (following gas production) their transplantation into secondary brilliant-green bile (2 per cent) broth produces a confirmation picture statistically so close to the old "complete" test as to justify its promulgation for all classes of waters as the standard method of determining presence and density of the coli-aerogenes group.

With these four ideas in mind, I have prepared the following general rearrangement of methods for determination of the coli-aerogenes type of organisms as they may be found in water and sewage. It has been placed in the hands of the editorial committee on *Standard Methods* as well as a number of other men interested in the subject. Naturally comments are invited.

PROPOSAL FOR REARRANGEMENT OF METHODS FOR DETERMINATION OF COLI-AEROGENES GROUP

1. The coli-aerogenes group shall be considered as including those organisms which ferment lactose with gas formation and are capable of aerobic growth on solid media. Organisms of this group are Gram-negative, non-spore forming bacilli.

2. Routine tests for this group fall into two categories.

- a. Tests for the presence of and density of the group in standard portions of the sample. Such tests, at the present time, appear best made by original plantings on one or more portions of a sample in decimal dilutions in liquid media.
- b. Tests for the relative density of organisms of the colon or aerogenes type in any standard sample portion. Such tests, expressed in relative terms only, appear best made by original plantings of standard portions of a sample in a medium which by virtue of its content of certain materials, produces colonies of both of the sought for organisms having distinct and differing appearance.

3. Tests for the density of coli-aerogenes group organisms shall involve the following required procedures for confirmation:

- a. Inoculation of standard lactose broth with a measured quantity of the sample.
- b. If fermentation with gas productions results within 24 or 48 hours transfer a loopful of the active culture into a tube of brilliant-green bile broth.
- c. If fermentation with gas production results therein within 48 hours, the presence of the colon-aerogenes group shall be considered "confirmed."
- d. The technician, at his option, may inoculate in parallel with the primary lactose broth tube, a tube of brilliant-green bile broth, methylene-blue erythrosine brom-cresol-purple broth or other modified lactose broths having similar selective action. The use of such materials shall not be related to the density picture produced by the primary lactose broth tubes, but shall be related to such ideas as to activity of pollution as the technician may have gained in his experience with water supply treatment problems.
- e. The technician may, at his option, at the same time the secondary brilliant-green bile tube is planted, transfer a portion of the lactose broth growth to a tube (slant) or plate of plain agar, Endo's agar, eosine-methylene-blue agar, methylene blue erythrosine brom-cresol-purple agar or similar solid media in order to demonstrate the ability of the organisms to grow under aerobic conditions and to indicate if desired the type of organism present in the primary broth culture.

4. In making dilution plantings, the amounts of sample selected should be such that the

largest portions will result in gas production in all or the majority of broth tubes into which they are inoculated, and such that the smallest portions will result in no gas production in all or the majority of broth tubes into which these smallest portions are inoculated. Because the numerical value of the bacterial content is largely determined by the analytical result of that dilution or dilutions of the sample intermediate between the above mentioned ones, the greater number of tube plantings should be made of this intermediate or critical portion. The number of such critical portions to be inoculated will be governed by the desired accuracy of the result (and for finished drinking waters should be not less than 5) while, the numbers of largest and smallest portions to be inoculated will be governed by the probable accuracy of the estimate of the bacterial content at the time the series of dilutions is decided upon. (This paragraph has been phrased by J. K. Hoskins of the U.S.P.H.S.)

Computation of coli-aerogenes density based upon plantings in liquid media shall be made according to the methods outlined in *Public Health Bulletin No. 1170* or later publications by them on this subject.

5. Tests for the relative density of the colon or aerogenes type shall be made by planting a sufficient quantity of the sample in a medium which becomes solid at incubator temperature and upon which the organisms of the two types grow with distinct and differing characteristics. Cyanide citrate agar, methylene-blue erythrosine brom-cresol-purple agar or brom-thynol-blue agar may be used for this purpose. Plates shall be poured in such numbers or having such density of colony growth as to produce not less than 10 colonies of the coli-aerogenes type if the relative density of each type is to be recorded.

It should be remembered that the present state of knowledge regarding the relative growth supporting powers of these solid media on the one hand, and lactose broth on the other, is not sufficient to justify the enumeration of absolute density of coli-aerogenes group organisms by the pour plate method. The decimal dilution method involving the use of primary lactose broth tubes remains the accepted method of enumerating coli-aerogenes density.

Completion of the diagnosis of the character or the organisms grown on the pour plate shall be made by the use of methods XIX-c and XX in appendix II, 7th edition--*Standard Methods*.

M. H. McCrady, F.A.P.H.A.

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THE following results of a recent comparison of methods for confirming lactose broth presumptives may be of interest in connection with this discussion. All routine broth tubes planted with 10 c.c. portions of water which showed gas were tested by two methods of confirmation:

Complete confirmation by Standard Methods

Gas production within 48 hr. in brilliant-green bile 2 per cent inoculated with a loopful of the presumptive lactose broth.

The majority of the waters examined were from wells and springs, many from slightly polluted surface waters; only a few were from treated or filtered supplies. Most of the published work on brilliant-green bile has been done on treated or filtered water; in consequence, our results are of interest because of the different type of samples examined.

A total of 2,200 positive presumptives obtained from 781 samples yielded the following results:

Number identical by both methods	Number positive by Standard Methods, negative by Brill.-Green Bile	Number negative by Standard Methods, positive by Brill.-Green Bile
1,789	186	225
81%	8%	10%

It is interesting to note that, in the course of the confirmation of the lactose broth presumptives, the examination of two colonies instead of one colony on the eosin-methylene blue plate, resulted in 160 additional complete confirmations. In consequence, the differences noted above total only a little more than twice the error resulting from limiting the examination of the agar plate to one single colony.

These results are very promising. Many similar favorable reports of the secondary brilliant-green bile method of confirmation, when employed with

waters from purification plants, have been reported by other workers. Evidently careful consideration of this procedure as an optional method of confirmation is warranted.

Before this discussion is closed, I should like to stress one point which, in my estimation, is of extreme importance in routine water control. That is the desirability of more complete knowledge of the immediate quality of our water supplies. Because of the lack of simple official bacteriological methods, sufficiently satisfactory knowledge in this regard, as revealed by the colon test, is frequently delayed. A chlorinator may falter, a forgotten cross-connection may function, but unless the resulting pollution of the supply is excessive, we are often left in ignorance of the event until a succession of doubtful results, extending over a period of days, finally convinces us that something is wrong.

Are we sufficiently cognizant of the fact that, even when employing the official five 10 c.c. volumes of sample, the lack of precision of this method is such that the occurrence of a single positive signifies a possibility, by no means negligible, of a colon organism content of over 10 per 100 c.c. instead of the 2 per 100 c.c. indicated by the result? In order to make our knowledge more complete we should so increase the frequency of sampling as to render us more than reasonably sure that our supplies are safe. The health of large populations is dependent, in large measure, upon our laboratory work and we dare neglect no effort which may enable us satisfactorily to meet this responsibility.

The present *Standard Methods*, because of the complicated confirmation required, prohibits the desired frequency of sampling. Even in the more

prosperous years this was true; at the present time many laboratories are forced either to cut the service or to employ unofficial methods.

A determined effort, on the part of this Section and other water laboratory organizations, is in order, to attempt to

devise means not only to simplify our bacteriological methods of water examination but, if possible, to make them more dependable. It may be found impossible to effect such improvement, but we can at least make a concerted and resolute effort toward this end.

R. E. NOBLE

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IN Chicago, the Board of Health Laboratories receive many water samples collected for investigational purposes, brought in by the Food Bureau, the Sanitary Bureau, and the Division of Water Safety Control. Often these samples develop pseudo-positive presumptive tests in the usual incubation period, somewhat less than 48 hours, or develop only suggestive (non-typical) growth on eosin-methylene blue agar plates. Many represent the possibility of acute emergency. Therefore, the Bureau Chief wants to know definitely and as soon as possible whether colon-aerogenes organisms are present, as evidence in part, for basis of action.

In order to meet this need for definite early returns, we make a direct plating in ferrocyanide-citrate agar, in parallel with the Standard Method. To illustrate the practical advantage of these direct plating results, I cite one instance which concerns a wide survey of the drinking water on the grounds of the World's Fair which caused those in authority a considerable amount of worry, because a few isolated samples from drinking stands had been found contaminated. This was during the peak of attendance, and the element of emergency was quite pronounced.

Seven samples were collected September 5 from one drinking water concession. On the morning of September 7, about 42 hours after the initial plantings, the following comparative results were recorded: All samples except 1 showed gas in lactose broth. Of

those, the direct plating results showed all but 2 samples negative for the colon-aerogenes group. At this point, as you can appreciate, the gas formation in the tubes would have accentuated the worry in the absence of any additional information such as was afforded by our direct plates. Upon completion of the standard test, requiring 5 days, 2 samples were negative by both methods; of the remaining 5 samples, 3 were negative by direct plates but positive by the standard test, with indices of 6, 6, and 10 per 100 c.c. All portions which confirmed to give these indices, except 1, showed non-typical colonies on eosin-methylene blue agar plates. The 1 showed aerogenes growth; the fourth showed only aerogenes by both methods; the fifth showed only *B. coli* by the Standard Method, while the direct plating 1 revealed both coli and aerogenes present.

The point to be made here is that the Bureau Chief was no longer interested in the 5-day results because action had already been taken on the basis of the 42-hour direct plating results. Incidentally the situation proved to be merely a local infection which was cleared up promptly, and all apprehension removed.

This is a fairly representative picture of how the two methods work in parallel. In the interpretation of the bacterial results from the hundreds of private well samples in conjunction with the corresponding sanitary surveys, examined each season in our labora-

tory, this direct plating method has proved of great help in determining whether a sample represents gross fecal pollution, surface drainage contamination, or probable infection of washers or

packing in the pumping or distribution system, and whether such infection consists of colon-aerogenes types, separately or together, or whether it is caused merely by extraneous forms.

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THIS discussion has been very interesting to those of use who are responsible for preparing *Standard Methods for the Bacteriological Examination of Milk*. Provisional methods for making determinations of the presence of organisms of the colon group have been included in the new (6th) edition of *Standard Methods of Milk Analysis* so that any comparative study that is to be made of methods of determining the presence of organisms of the colon group in water and sewage will have a direct bearing on methods of milk examination and the studies planned should be made with this thought in mind.

As a result of papers that were presented this morning before the Laboratory Section it is evident that comparative studies should also be started

in a series of milk control laboratories with the purpose in mind of determining whether a change should be made in our standard incubation temperature from 37° C. to 32° C., introducing at the same time an agar with a composition that will grow a larger proportion of the bacteria normally present in the milk than does our present standard agar.

While this matter has no direct bearing on this discussion, I have always wondered why students of water bacteriology are content to use such unsatisfactory methods of making bacterial counts from water as are included in our present standard procedures. It seems to me that any studies on methods of counting bacteria in milk should be made so as to apply to water and sewage as well.

Ninth Conference of the International Union Against Tuberculosis

THE Ninth Conference of the International Union Against Tuberculosis will meet in Warsaw, Poland, on September 4-6, 1934, under the chairmanship of Prof. Pieztrzynski.

Delegates are expected from the 43 countries represented in the Union. An attractive program of receptions and excursions has been arranged and visits will be made to the important anti-

tuberculosis institutions of Poland.

A special party is being arranged from the United States and for those who can leave in advance a trip to Russia is scheduled that will permit delegates to arrive in Warsaw in time for the meeting. Further information may be obtained by addressing the National Tuberculosis Association, 50 West 50th Street, New York.

Studies on Acidophilus Milk*

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IN order to obtain more information upon the therapeutic value of acidophilus milk, experiments have been conducted on 124 persons over a period of 18 months, examining 2,172 samples of fecal material from these patients. An attempt has been made to establish, approximately, certain physical and biochemical properties and the bacteriological flora of human beings:

1. Who have not consumed acidophilus milk
2. Who were consuming daily 50-100 gm. of beta lactose
3. Who were consuming daily 1 quart of sweet milk containing 3 per cent of added beta lactose
4. Who were consuming acidophilus milk
5. Who have previously consumed acidophilus milk

Of the 124 patients studied, 66 were constipated or abnormal. The remaining 58 considered themselves non-constipated or normal before beginning consumption of acidophilus milk. Data obtained from these two types of persons have been studied separately in an endeavor to establish any differences in the physical and biochemical properties and the bacteriological flora of their feces. All patients on this experiment continued their regular diet, exercise, etc., in so far as it was possible. Any changes observed may, therefore more logically be assumed to have been caused by the consumption of

lactose, or milk to which lactose had been added, or acidophilus milk.

Of the 2,172 samples of fecal material examined, 734 were from 124 patients who had never consumed any acidophilus milk; 36 from 3 patients who were consuming daily 50-100 gm. of beta lactose; 113 from 12 patients consuming daily 1 qt. of sweet milk to which 3 per cent of beta lactose had been added; 1,038 from 91 patients while consuming acidophilus milk; 175 from 25 patients after their consumption of acidophilus milk, and while they were consuming sweet milk to which 3 per cent lactose had been added; and 76 from 15 patients after their consumption of acidophilus milk, and while consuming sour milk containing 3 per cent added lactose, but no acidophilus bacteria.

Laboratory tests were applied to each sample of feces to determine:

1. Number of lactobacilli
2. The number of Gram-negative, non-sporulating, gas producing colon types
3. Streptococci
4. Yeasts
5. Sporulating anaerobes
6. Sporulating aerobes
7. pH
8. Amount of indol.
9. Total weight
10. Per cent moisture

All of the persons examined were found to have lactobacilli in their intestinal tracts. The number most often found present was 1,000 per gm. of feces. Approximately 40 per cent of the samples were found to have more

*Read before the Laboratory Section of the American Public Health Association at the Sixty-second Annual Meeting in Indianapolis, Ind., October 13, 1933

than 1,000 per gm., occasional samples containing more than 1,000,000 per gm. The results of these experiments indicate that the consumption of these amounts of lactose, sweet milk to which lactose had been added, or acidophilus milk with or without additional lactose influenced little or not at all the numbers of lactobacilli normally growing in the human intestinal tract.

During the time the patients were drinking acidophilus milk, approximately 35 per cent of the samples examined contained more than 10,000,000 per gm. of the acidophilus bacteria being consumed. Approximately another 35 per cent contained from 100,000,000 to more than 1,000,000,000 of the acidophilus bacteria fed in the milk.

The types of acidophilus bacteria in the milk soon disappeared from the feces after discontinuing the consumption of acidophilus milk. Approximately all lactobacilli, of the types fed in the milk, disappeared within 2 to 6 weeks after stopping the consumption of acidophilus milk, even though patients continued to take milk containing added lactose.

The gas producing, non-sporulating colon types of bacteria were found to be present in numbers exceeding 10,000,000 per gm. in more than half of the samples tested, approximately one-fifth of the samples containing 100,000,000 to more than 1,000,000,000 of these bacteria per gm. of feces. A summary of all samples examined before acidophilus milk was consumed, while it was being taken, and after its consumption, shows little or no change in the numbers of non-sporulating, gas producing colon bacteria present. The consumption of acidophilus milk over a period of 3 months or longer tended to decrease slightly the numbers of colon bacteria. This was especially true of constipated patients.

A study of the data accumulated on the number of streptococci present in

human feces from persons who had never consumed acidophilus milk showed fully two-thirds of the samples tested contained more than 10,000,000 streptococci per gm., approximately one-fifth of the samples examined containing from 100,000,000 to more than 1,000,000,000. During the period in which the patients were drinking acidophilus milk, the data indicated a very definite tendency toward a decrease in the number of streptococci present in the fecal material. This tendency was more pronounced in the non-constipated persons.

A very small number of yeasts were found; more than half of the samples contained less than 100 per gm. Occasional specimens contained as many as 1,000,000 per gm., but the majority of the samples showing any yeasts, by the tests employed, contained only a few hundred per gm. of feces.

Approximately one-half of the samples from patients who had not had acidophilus milk contained more than 1,000,000 sporulating anaerobic bacteria per gm. of feces, occasional samples showing numbers exceeding 1,000,000,000 per gm. The consumption of acidophilus milk showed a definite tendency toward decreasing the large numbers of sporulating anaerobic bacteria. Indications were observed that the numbers of *Clostridium welchii*, or that type of anaerobic bacteria which produces a rapid and stormy fermentation in milk, decreased slightly in numbers during the consumption of acidophilus milk.

The approximate numbers of sporulating aerobic bacteria present during and after the feeding of acidophilus milk were determined. From one-third to one-half of the samples tested were found to contain less than 100 of these bacteria per gm. of fecal material. Occasional samples, however, showed very large numbers, sometimes exceeding 1,000,000,000 per gm.

Fecal material from patients consuming acidophilus milk showed a definite decrease in the amount of indol present in the feces. It is not possible, however, to say how much of this decrease in indol was due to the consumption of acidophilus bacteria. The patients who drank milk to which 3 per cent lactose had been added, but containing no acidophilus bacteria, showed a similar tendency toward a decrease in the indol content of the fecal material.

By electrometric methods, the pH has been determined on all samples of feces. The data do not indicate any change in reaction or any trend toward a change due to the consumption of lactose, milk to which lactose had been added, or acidophilus milk with or without added lactose. The average pH of human feces was found to be approximately 7.30.

The results obtained on the amount of moisture present showed the stools from persons constipated contained less moisture than stools from normal patients. The consumption of acidophilus milk caused the percentage of moisture to increase in both constipated and non-constipated persons. During the period of 4 to 6 weeks after the patients had discontinued acidophilus milk, and were consuming milk con-

taining added lactose but no acidophilus bacteria, the amount of moisture in the stools from constipated persons gradually tended to revert to its original amount. During this period the moisture content of non-constipated persons continued to remain high. The moisture content of constipated persons was about 72.0 per cent; of non-constipated persons about 74.0 per cent; of persons consuming acidophilus milk 76.0 to 77.0 per cent.

The average weight of 348 stools collected from persons who had never consumed acidophilus milk was approximately 95 gm. Of 839 stools from patients consuming acidophilus milk, the average weight increased fully 10 gm., the increase being as much as 20 gm. on stools from non-constipated persons. The data indicate at least a part of this increased evacuation to have been caused by the consumption of lactose in the milk.

Of 74 persons who finished these experiments, 43 were constipated. Twenty-nine of this number, or approximately two-thirds of those persons experiencing intestinal difficulties, were benefitted by acidophilus therapy. A majority of the non-constipated persons reported themselves in a much better physical condition while they were drinking acidophilus milk.

Vaccine Prepared from Chicken Embryo Cultures for Immunization Against Smallpox*

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MODIFICATIONS in the method of preparing smallpox vaccine, in general, have had as their objective a bacteria-free product which would induce the maximum number of "takes" with the minimum of severe reactions. Approximately 20 years ago, the production of vaccine by the testicular method developed by Noguchi¹ was undertaken in this laboratory, but the instability and variability of the potency of this material made it unsuitable for general distribution. Recent literature contains the description of two other methods by which bacteria-free vaccines may be obtained; namely, those of Li and Rivers,^{2, 3} and of Goodpasture and his coworkers,⁴ which latter seems more complicated and to offer more opportunity for contamination than the former. The procedure of Li and Rivers consists of cultivating vaccine virus in shallow layers of a medium made by suspending in Tyrode's solution a small quantity of minced tissue from 10 day old chicken embryos.

This technic was used in preliminary experiments, begun in June, 1931, with a dermal strain of virus obtained from Rivers, to determine the effect on the potency of the virus of continued cul-

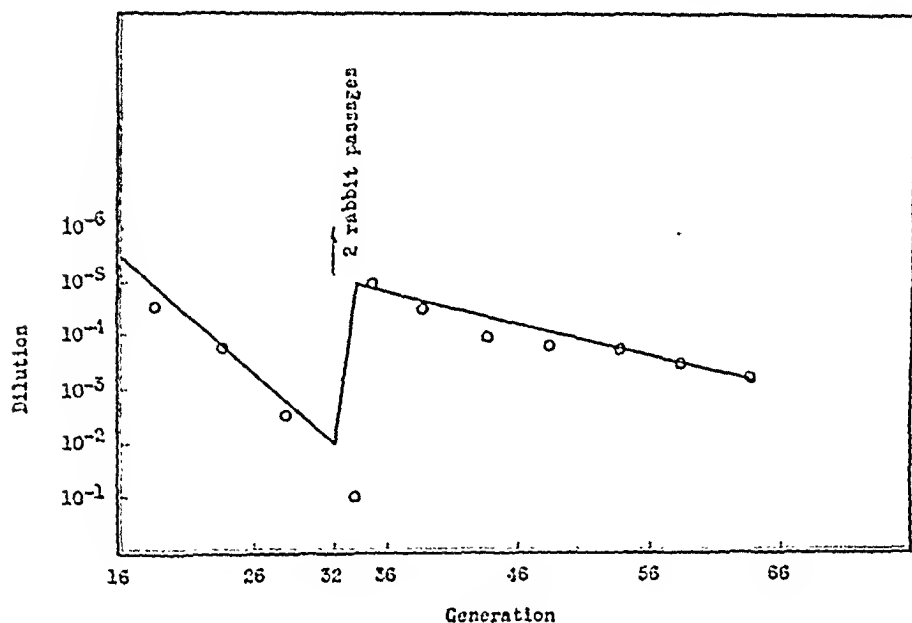
vation *in vitro*. The first lot of medium prepared was inoculated with 0.25 c.c. of a 1:20 dilution in Tyrode's solution of the sixteenth generation in the embryo medium preserved with 50 per cent glycerol. Each of the following transfers, made at 5-day intervals, was inoculated with 0.25 c.c. of undiluted and unglycerolated material from the preceding generation. The potency of the virus in each generation was determined by the cutaneous reactions induced in rabbits from 5 to 7 days after inoculation with 0.25 c.c. of various dilutions of the culture in Locke's solution.

Since, after 32 generations in the chicken embryo medium, the potency of the virus had decreased markedly, testicular passage through rabbits was resorted to. After 2 passages, a new series of cultures *in vitro* was initiated, the testicular emulsion being used as seed. Graph I summarizes these experiments. It is evident that, although the potency of vaccine virus decreases after prolonged cultivation *in vitro*, according to tests on rabbits, it may be reestablished by passage through rabbits, and that loss of potency seems to occur less rapidly after animal passage.

The glycerolated vaccine made from 5-day cultures in the embryo medium has been tested for stability at various temperatures. The tissue cultures were

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GRAPH I—Effect of cultivation in chicken embryo medium on the potency of vaccine virus



Each point represents average titer of 5 consecutive generations. Titer = highest dilution, 0.25 c.c. of which induced within 7 days a positive cutaneous reaction in rabbits.

pooled and rubbed through copper gauze and an equal volume of glycerol was added. Portions of this material were tested on rabbits after periods of 24 and 48 hours at 37° C. and of 48 hours at 3° C. in shallow layers open to the air. Twenty-five hundredths c.c. of a 1:10,000 dilution of each induced definite reactions when injected intracutaneously in rabbits. The reactions induced by the material which had been incubated at 37° C. were slightly weaker. Areas of scarified skin which had been inoculated with the undiluted vaccine of all three lots developed confluent vesicles.

Results of the storage of vaccine in small rubber-stoppered bottles at room temperature, 3° C., and -5° C., are given in Graph II, from which it is obvious that the deterioration of the material exposed to the air is much less rapid at the lower temperature. Other lots of vaccine have been stored under

a vaseline seal at 3° C. for 12 months and at -5° C. for from 13 to 20 months without apparent change in potency. The glycerolated material has been used to initiate new cultures in the chicken embryo medium after 8 months' storage at -5° C. with excellent results.

After the completion of these experiments on the effect on potency of continued cultivation *in vitro* and of storage at various temperatures, the results of which are largely confirmatory of the work of Rivers,^{3, 5} vaccines were prepared for human inoculation. One lot of glycerolated vaccine (No. 1) which had been stored under a vaseline seal for 1 year at -5° C. and had been proved by repeated sterility tests to be free from both aerobic and anaerobic bacteria, was filled in capillary tubes in approximately 0.02 c.c. amounts. This vaccine, a 1:1,000 dilution of which induced a reaction in rabbits, failed to

"take" in 4 unvaccinated children, aged 2 years, when inoculated by the multiple-puncture (10-20) method.

Another vaccine (No. 2) which had been stored for only 1 month and was of sufficient potency to react in rabbits in dilutions of 1:100,000 or 1:10,000, was filled in capillary tubes. The vaccination by the multiple-puncture (30) method of 2 children under 2 years of age with this material resulted in 1 "take." The 5 children unsuccessfully inoculated were revaccinated with vaccine No. 2 by the single-scratch method. All but 1 developed primary vaccinia. In 4 other children from 1½ to 2½ years of age, this vaccine inoculated by the single-scratch method induced 2 "takes."

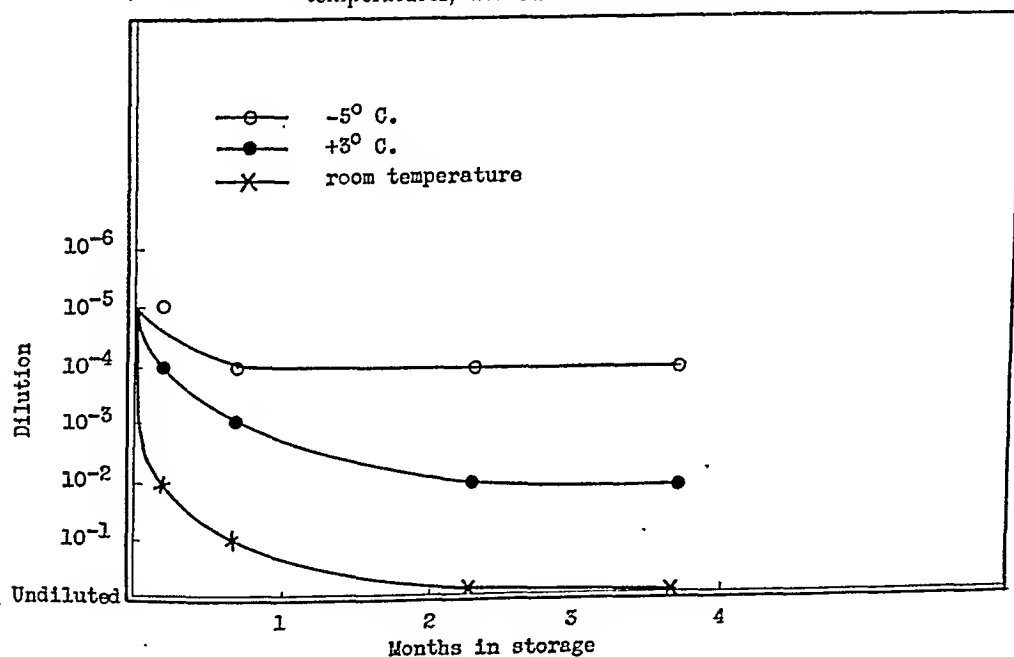
The vaccination by the single-scratch method of 14 children under 2 years of age with a third vaccine similar in all respects to vaccine No. 2, resulted in 7 failures. Five of these children later developed "takes," following vaccination with calf lymph; 1 failed to react, and 1 was not reinoculated.

In order to control the technic of

vaccination by the single-scratch method, two groups of 4 children each were vaccinated with calf and tissue culture vaccines respectively. The calf vaccine induced 3 "takes"; the experimental material 2.

The reactions induced by the tissue culture vaccine were in no way remarkable. Four of the 14 who developed "takes" had temperatures of over 99° F. during the course of the vaccination. In 1 case, the temperature rose on the second day after inoculation and continued for 4 days between 105.4 and 100° F. The local reaction was not severe nor was there any glandular involvement. In 2 other cases, the temperatures ranged from 103 to 99° F. between the 6th and 12th days after vaccination. The local reaction in 1 of these children was severe and the axillary glands were palpable for several days. The fourth child developed an ear infection on the 4th day following inoculation. His temperature rose to 104.8° F. on the same day and returned to normal on the 9th day. In all cases, complete healing occurred

GRAPH II—Potency of vaccine stored in small rubber-stoppered bottles at different temperatures, without exclusion of air



in from 3 to 6 weeks, leaving a scar of less than 1 cm. in diameter.

Although the number of human vaccinations reported in this paper is insufficient to form a basis for any significant conclusions as to the efficacy of the culture vaccine, it is apparent that the method of inoculation markedly affects the percentage of "takes." Of 28 multiple insertions of unglycerolated culture vaccine on 7 children, 25 positive reactions are reported by Herzberg.⁶ Rivers³ has reported only 1 failure in 35 inoculations of glycerolated vaccine by scarification, while we obtained by the single-scratch and multiple-puncture methods only 14 positive reactions in 23 cases, some of which were revaccinated before "takes" resulted. It may be that the use of a more rigorous method of inoculation or a more potent vaccine can be safely resorted to with the culture material.

CONCLUSIONS

Vaccine virus, when cultivated for long periods in a medium consisting of minced chicken embryo tissue suspended in Tyrode's solution, gradually decreases in potency according to the cutaneous reactions induced in rabbits.

The potency of the culture virus can

be regained by passage through the testicles of rabbits.

Vaccines prepared from chicken embryo cultures can be stored at low temperatures for considerable periods without loss of potency if air is excluded.

Children vaccinated with culture vaccine developed characteristic primary vaccinia, but the percentage of "takes" is lower than that among children vaccinated with calf lymph, when either the multiple-puncture or single-scratch method is used.

Since the culture vaccine is both potent and stable, further study should be carried out to determine a method of preparing it for distribution so that it will equal calf lymph in efficacy.

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Effect of Temperature of Incubation Upon Agar Plate Count of Milk*

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DURING the course of studies on temperature variations in bacteriological incubators¹ marked discrepancies in colony counts from duplicate standard agar plates were noted. Lack of information on the causes for such discrepancies led to their study. It was found that slight variations in temperature from 37° C., were responsible for significant errors in colony counts.

In view of the fact that in studies of 14 different bacteriological incubators, none varied less than 2° C. during a 48 hour period even when lightly loaded while one varied in temperature as much as 11° C., it seemed desirable to study in detail the effect of temperature of incubation upon the standard agar plate count of various dairy products.

METHODS

Usually 75 duplicate agar plates were prepared from a milk sample according to the *Standard Methods* of the American Public Health Association. Either 5 or 10 of these were placed in incubators operating at approximately 21°, 25°, 30°, 32°, 35°, 37°, 39°, 45°, and 55° C. In each incubator the plates were grouped about a closed flask of water containing a thermometer. At least 5 temperature readings were taken during the 48 hour incubation

period. The average temperature reading was then assumed to be the approximate temperature of incubation of the agar plates. The colonies were counted at the end of a 48 hour incubation period ± 3 hours. From these counts the average number of colonies obtained upon the plates in each incubator was calculated.

In order to compare different samples of milk, average colony counts were calculated as percentages of the maximum average colony count. Percentages were then plotted against temperatures of incubation and a smooth curve drawn between points from which, by interpolation, the equivalent percentage for any temperature of incubation could be determined.

RESULTS

The effect of the temperature of incubation upon the plate count obtained from 78 samples of dairy products has been studied, but since they represent different types of products, they will be treated in groups.

Bottled Pasteurized Milk from Various Cities—Twenty-nine samples of bottled pasteurized milk were obtained from 25 dealers in the following large cities: Detroit, Boston, New York, Newark, N. J., Philadelphia, Rochester, and the smaller cities of Elmira, Seneca Falls, Ithaca, Watkins Glen, Maspeth, Phelps, and Geneva, located in New York State. In the majority of cases, the milk was examined within the 24 hours following pasteurization and was

* Approved by the Director of the New York Agr. Exper. Sta. for publication as *Journal Paper No. 14*. Read before the Laboratory Section of the American Public Health Association at the Sixty-second Annual Meeting in Indianapolis, Ind., October 12, 1933.

representative of bottled pasteurized milk as it was delivered to the consumer. None of the samples in this series showed the presence of thermophilic bacteria when agar plates were incubated at 55° C.

In general, the curves show an increasing count as the temperature is increased up to about 32° C. (Figure 1). As the temperature is increased above this the count decreases. To be more specific, of the 29 samples, 12 apparently showed a maximum 48 hour count at 32° C., 4 at 31½°, 8 at 31°, 2 at 32½° and 1 each at 30°, 33° and 34½°. With temperatures much below 32° C., the 48 hour incubation time was too short to allow development of many colonies to a stage where they were visible to the eye.

The curves show that the maximum average colony count for all samples was obtained with an incubation temperature of approximately 32° C. Occasionally when the average 32°

count was only slightly above the 37° count, the highest counts from individual plates at 37° were higher than the lowest counts from individual plates at 32° C. Samples were more comparable at 32° C. than at any other temperature of incubation. That is, at that temperature, the least variation from the maximum count, from .85 to 100 per cent was obtained. Only the one sample showed average counts at 32° C., less than 95 per cent of the maximum count obtained.

The curves also show that the 37° C. count is, on the average, approximately only 50 per cent of the 32° C. count although great variation in this respect may be noted between the different samples. The 37° C. count ranged between 10 per cent and 89 per cent of the maximum count, thereby showing a definite lack of uniformity in the percentage of the maximum count. Furthermore, 37° C. in general, is at the steepest part of the descending

FIGURE 1.—Relation between temperature of incubation and colony counts obtained from 29 samples of pasteurized milk. Standard agar plates used. Incubated for 48 hours.

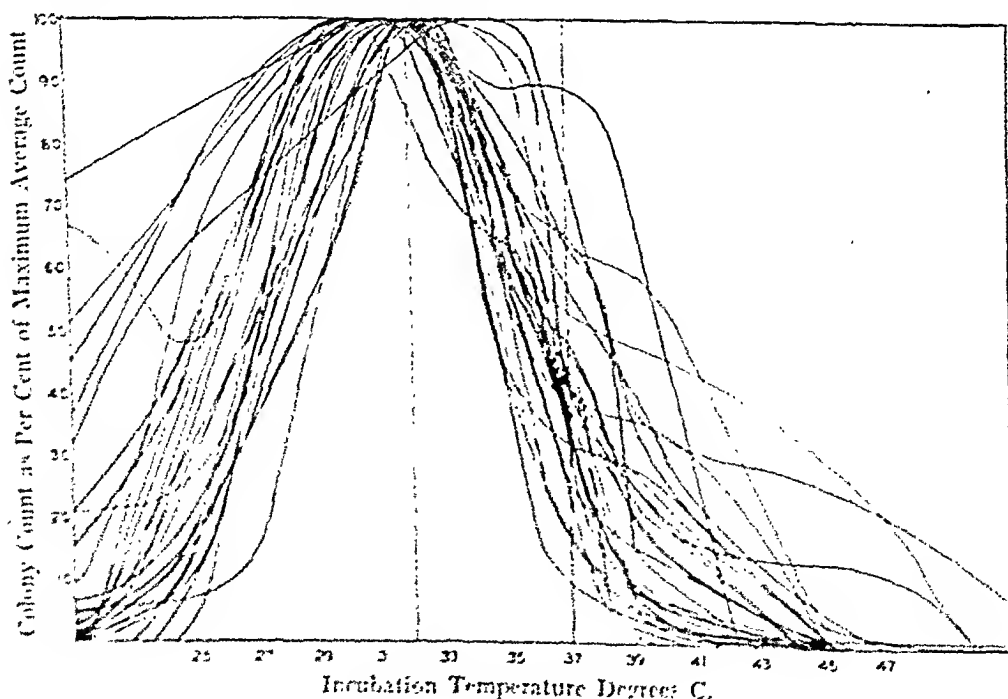
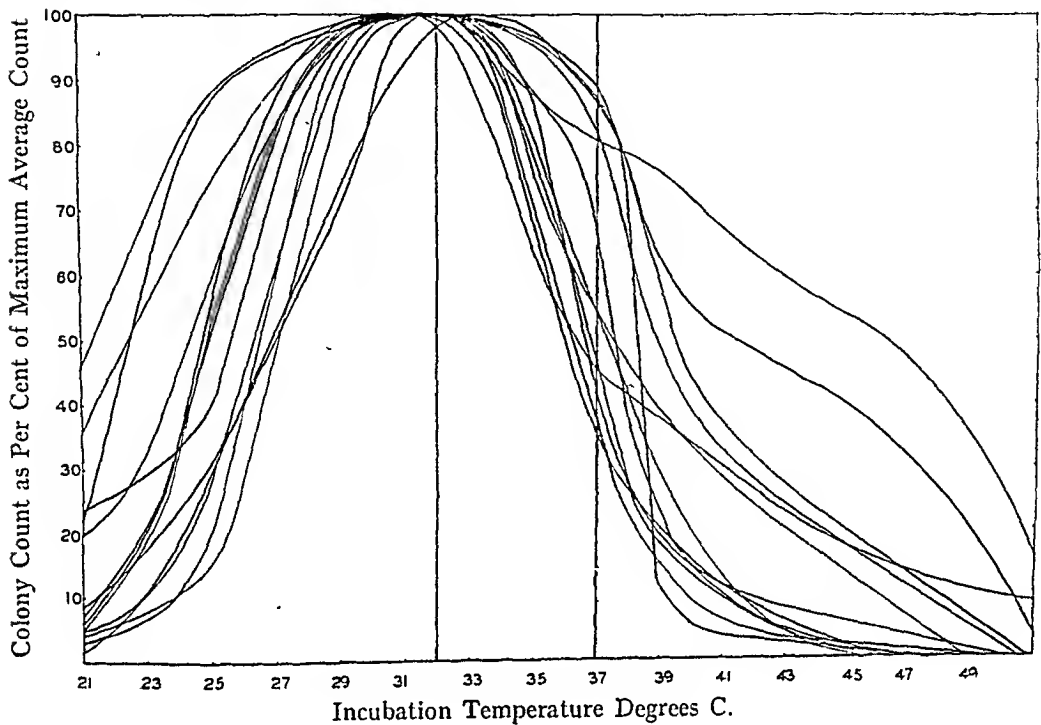


FIGURE II—Relation between temperature of incubation and colony counts obtained from 13 samples of pasteurized milk from one distributor. Standard agar plates used. Incubated for 48 hours.



curve which means that temperature variations from 37° C. are responsible for great errors.

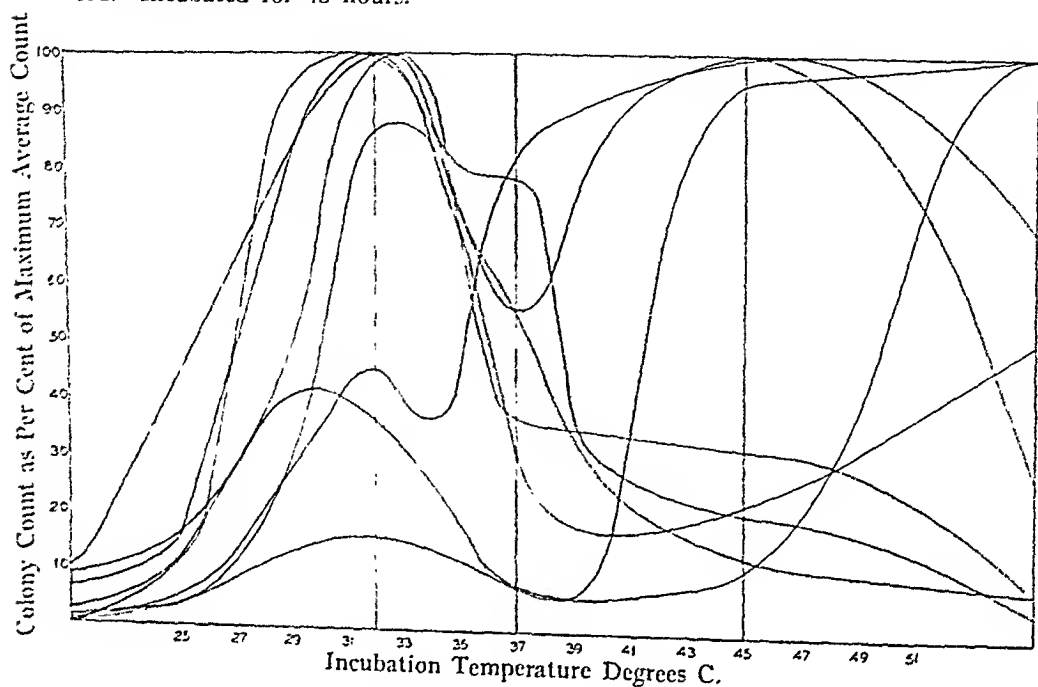
Bottled Pasteurized Milk from a Single Source—Counts were obtained from 13 samples of pasteurized milk collected from a local distributor during a period of 18 months. The curves (Figure II) are similar to those for samples of pasteurized milk collected from a variety of sources. A temperature of 32° C. is again superior in many respects to one of 37° C. Of the 13 samples, maximum counts were obtained for 2 at 31°, 7 at 31° to 32°, 3 at 32°, and 1 at 33°. The 32° count was from 98 to 100 per cent of the maximum in all cases. On the other hand, the 37° count varied from 36 to 89 per cent of the maximum.

Bottled Pasteurized Milk Containing Thermophiles—Eight samples of pasteurized milk which were found to contain numerous thermophilic bacteria upon incubation of agar plates at 55°

C. were examined. These were obtained from dairies in New York, Philadelphia, Detroit, Boston, Rochester, and Waterloo, N. Y. If the individual curves (Figure III) are followed, it will be noted that in each case there are two peaks, the first of which occurs at about 32° C. and the second at 45° C. to 55° C. Microscopic examination of these milks revealed that many of the thermophiles did not develop colonies on plates. This is not surprising as it has been shown that thermophiles do not develop readily after the milk sample has been refrigerated 24 hours. In the case of 7 out of 8 samples, 32° counts were higher than 37° C. counts. This was evidently due to the fact that 37° C. was near the minimum temperature for the growth of the thermophilic bacteria.

Bottled Raw Milk—Counts were obtained from 8 samples of raw milk from individual producers in New York State. Seven of these producers were

FIGURE III—Relation between temperature of incubation and colony counts obtained from 8 samples of pasteurized milk containing thermophiles. Standard agar plates used. Incubated for 48 hours.



delivering to a Grade A pasteurizing plant where the standard agar plate count was used as the basis for the payment of premiums for milk with low bacterial counts. The maximum count was obtained at 32° C. for 5 samples, at 31° C. for 1, and 30° C. for 2 (Figure IV). On the average, at 37° C., about 70 per cent of the maximum

count was obtained. The 32° C. counts varied from 91 to 100 per cent of the maximum while the 37° C. counts varied from 65 to 78 per cent of the maximum count. It may again be observed that 37° C. is in the steep part of the downward curve, and that temperature variations in 37° C. incubators will result in greater errors in the

FIGURE IV—Relation between temperature of incubation and colony counts obtained from 8 samples of raw milk from individual producers. Standard agar plates used. Incubated for 48 hours.

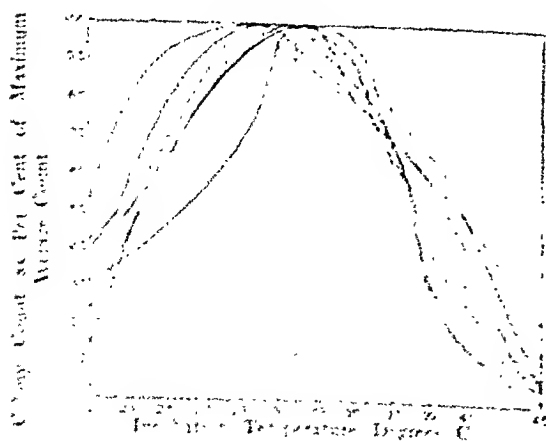


FIGURE V—Relation between temperature of incubation and colony counts obtained from 6 samples of raw milk from distributors. Standard agar plates used. Incubated for 48 hours.

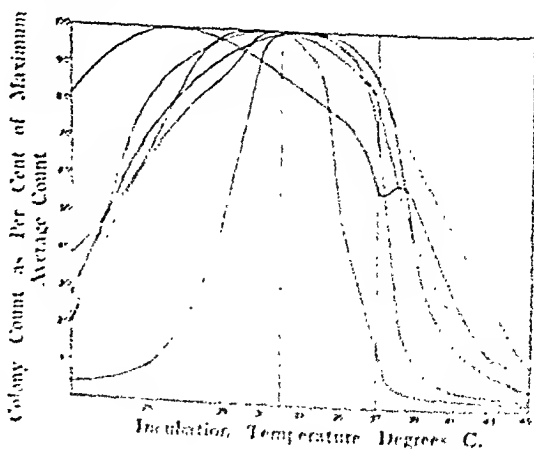
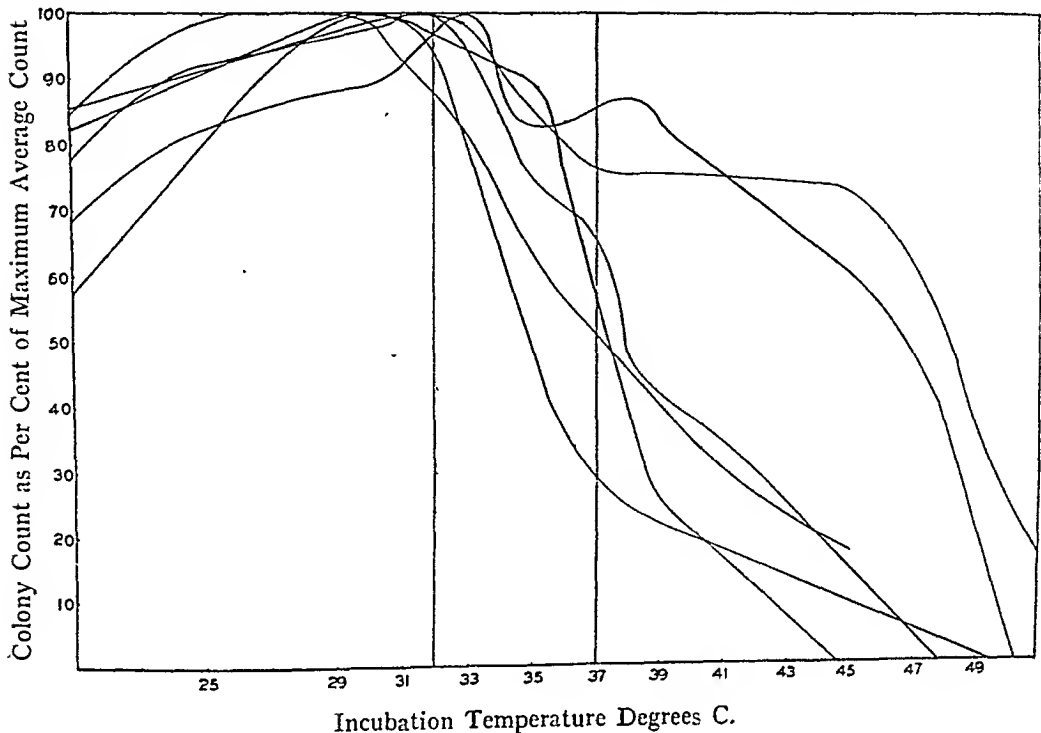


FIGURE VI—Relation between temperature of incubation and colony counts obtained from 6 samples of ice cream. Standard agar plates used. Incubated for 48 hours.



counts from milk of this type than will similar temperature variations in 32° C. incubators.

This matter is important to Grade A milk producers in New York State because in routine milk work of this nature large numbers of agar plates must be incubated at a time. This ordinarily results in greater temperature variations than in more lightly loaded incubators.

Six samples of raw milk collected from 6 small raw milk distributors produced counts of a similar nature (Figure V). It will again be noted that 32° C. incubation is superior to 37° C. The maximum counts were obtained at from 31° to 33° for 5 samples, but the 6th showed a maximum at a lower temperature, possibly about 27° C. The 32° counts varied from 88 to 100 per cent of the maximum while the 37° varied from 12 to 88 per cent.

Ice Cream Samples—Six ice cream samples representative of the pack of three small dealers and three large com-

mercial concerns were examined. It will be noted (Figure VI) that the percentages of the average maximum counts are much higher at incubation temperatures below 32° than in the case of the milk samples, indicating that the bacterial flora was composed of many organisms that grew well at low temperatures. The great variation between curves at 37° C. and the slight variation between curves at 32° C. indicate that 32° C. incubation is better than 37° C. for comparing the quality of different ice cream samples.

Cream Samples—Two samples of cream were plated, both showing curves similar to the others, the maximum count being obtained at 31°. the 37° counts being approximately 60 per cent of the maximum.

Miscellaneous and Unusual Samples—Six other samples of raw milk were tested. Three of these, 1 a sample of milk from a mastitis infected cow, showed a uniform count regardless of temperature of incubation. Average

TABLE I

AVERAGE PERCENTAGE ERROR CAUSED IN STANDARD AGAR PLATE COUNTS OF 42 NORMAL SAMPLES OF PASTEURIZED MILK BY 1° AND 2° VARIATIONS FROM INCUBATION TEMPERATURES OF 37° AND 32° C.

Average Percentage Error Due to Temperature Variations from

37° C.

32° C.

<i>Temperature of Incubation</i>	<i>Variation in ° C.</i>	<i>Average Percentage Error</i>	<i>Temperature of Incubation</i>	<i>Variation in ° C.</i>	<i>Average Percentage Error</i>
35°	— 2	+ 71	30°	— 2	— 6
36°	— 1	+ 33	31°	— 1	— 1
37°	0	0	32°	0	0
38°	+ 1	— 28	33°	+ 1	— 3
39°	+ 2	— 49	34°	+ 2	— 13

Average percentage of maximum count at 37° C. = 47.7
Average percentage of maximum count at 32° C. = 98.9

counts varied from 87 to 100 per cent at temperatures ranging from 30° to 39°, with rapid drops in counts above or below these temperatures. One of these showed a high count at 37°. The results obtained from the 3 remaining samples could not be used because the plates at 30°, 32°, and 35° contained too many colonies to count accurately. From estimates, the 37° count from 1 of these was about 4 per cent of the 32° count.

DISCUSSION

The standard 37° count does not give a definite percentage of the maximum count that may be obtained from standard media. Rather a great discrepancy exists in that counts have been obtained on different samples of milk showing that the 37° C. count may be as low as 4 per cent and as high as 100 per cent of the maximum that may be obtained. Counts from pasteurized milks average about 50 per cent of the maximum count, while counts from raw milks average somewhat higher than this.

Since incubator temperatures readily vary at least 2° from the standard of 37° under normal operating conditions, it is essential that consideration be given to the percentage error in count caused by temperature variations.

With 37° C. incubation as the standard (Table I) an incubation temperature of 35° C. (2° low) yielded on the average a colony count on the 42 samples of pasteurized milk, 71 per cent too high, while an incubation temperature of 39° C. (2° high) yielded an average colony count 49 per cent too low. An incubation temperature of 36° (1° low) yielded an average colony count 33 per cent too high while an incubation temperature of 38° (1° high) yielded an average colony count 28 per cent too low. These results show that while underheating of 1° and 2° reveals more bacteria than overheating, it is responsible for greater percentage errors than overheating.

How does this compare with the errors caused by similar variations from an incubation temperature of 32° C.? If the 32° C. count is considered as the standard, an incubation temperature of 30° C. (2° low) yielded a colony count 6 per cent too low (Table I) while an incubation temperature of 34° C. (2° high) yielded a colony count 13 per cent too low. An incubation temperature of 31° C. (1° low) yielded a colony count only 1 per cent too low, while an incubation temperature of 33° C. (1° high) yielded a colony count 3 per cent too low.

TABLE II

AVERAGE PERCENTAGE ERROR CAUSED IN STANDARD AGAR PLATE COUNTS OF 14 SAMPLES OF RAW MILK BY 1° AND 2° VARIATIONS FROM INCUBATION TEMPERATURES OF 37° C. AND 32° C.

Average Percentage Error Due to Temperature Variations from

37° C.			32° C.		
Tempera- ture of Incubation	Variation in ° C.	Average Percentage Error	Tempera- ture of Incubation	Variation in ° C.	Average Percentage Error
35°	— 2	+ 48	30°	— 2	— 4
36°	— 1	+ 26	31°	— 1	— 1
37°	0	0	32°	0	0
38°	+ 1	— 22	33°	+ 1	— 2
39°	+ 2	— 38	34°	+ 2	— 6

Average percentage of maximum count at 37° C. = 68.0

Average percentage of maximum count at 32° C. = 98.0

The data for 14 samples of raw milk when compared in the same way show similar percentage errors (Table II). Examination of the data on 8 samples of pasteurized milk containing thermophiles also shows similar percentage errors (Table III). These, of course, are not as significant since the variation in results from individual samples (Figure III) is so great.

It is therefore evident that variations from 32° C. caused much smaller errors than did variations from 37° C.

While others ^{2, 3} have recognized the

fact that incubation temperature at or near 30° C. gives counts higher than counts obtained at 37° C., and have argued for the use of lower incubation temperatures in standard methods for this reason, it is believed that this is the first time that it has been pointed out that the use of a temperature that yields the maximum count, at the same time reduces the size of errors due to variations in the temperature of incubation. Although the temperature at which the maximum count from milk samples is obtained varies somewhat de-

TABLE III

AVERAGE PERCENTAGE ERROR CAUSED IN STANDARD AGAR PLATE COUNTS OF 8 SAMPLES OF PASTEURIZED MILK CONTAINING THERMOPHILIC BACTERIA BY 1° AND 2° VARIATIONS FROM INCUBATION TEMPERATURES OF 37° C. AND 32° C.

Average Percentage Error Due to Temperature Variations from

37° C.			32° C.		
Tempera- ture of Incubation	Variation in ° C.	Average Percentage Error	Tempera- ture of Incubation	Variation in ° C.	Average Percentage Error
35°	— 2	+ 52	30°	— 2	— 13
36°	— 1	+ 20	31°	— 1	— 4
37°	0	0	32°	0	0
38°	+ 1	— 11	33°	+ 1	— 4
39°	+ 2	— 16	34°	+ 2	— 13

Average percentage of maximum count at 37° C. = 44.8

Average percentage of maximum count at 32° C. = 72.8

pending upon the sample, the average is very close to 32° C. and therefore this becomes a more desirable incubation temperature than 37° C.

It is realized that a change in incubation temperature in *Standard Methods* would necessitate the installation of a second incubator in a number of laboratories. In rooms where the temperature is warmer than 32° C., it is impossible to operate satisfactorily an incubator at 32° C. without installing some cooling device.

It is also possible that a change in composition in standard agar might so affect the counts that the temperature at which the maximum count would be obtained might be somewhat higher or lower than here reported. A change of length of time of incubation might also have a similar effect.

SUMMARY

An incubation temperature of 32° C. for 48 hours instead of 37° C. is recom-

mended for standard agar plates prepared from samples of milk and ice cream.

With 48 hour incubation, higher colony counts are obtained at 32° C. than at 37° C., resulting in a truer measure of quality.

At 32° C. there is less error in counts than at 37° C. due to temperature variation in the incubator.

The percentage of the maximum counts obtained in 48 hours varies considerably at 37° C. but is quite constant at 32° C. Therefore counts obtained at the latter temperature serve as a better means of comparing the quality of different samples.

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Health and Beauty

"SOMEONE had estimated that the regular customers of the 'beauty' industry in the United States number over 20,000,000 women, or 5 times as many as the total number of men enrolled under the American flag during the World War. . . . The procession passing in and out of the beauty parlors spends more than half a billion dollars a year, we are told, or more than one and a half million dollars a day. . . . If these women realized the beauty that health brings, some of the millions of dollars now spent in beauty parlors might go, with better results, for healing the big and little illnesses

that dim the eye, line the face, droop the erect figure, and play havoc generally with good looks.

"Every doctor can tell of beauty that has been brought back by restored health. Yet the big parade of women chasing beauty passes the doctor's office by, and pours a flood of gold into the purses of the beauticians. If the truth could only be implanted in woman's mind that there is no beauty like good health, the physicians would have a truly golden opportunity to improve the health and looks of the nation."—Editorial, *New York State J. M.*, Feb. 15, 1934, p. 159.

Microbiological Examination of Fresh and Frozen Fruits and Vegetables*

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BACTERIOLOGICAL examination of foods has a several-fold purpose: (1) to protect the consuming public from bacteria causing food poisoning and food-borne infections; (2) to determine the relation of the indigenous microbial flora to problems of food preservation; (3) to secure information concerning the conditions under which foods have been produced and handled. These purposes are especially significant for fresh and frozen fruits and vegetables.

Despite the fact that bacteriology has been of great service in the control of certain foods, it is almost without value for routine control of others. These limitations are frequently not recognized by those not familiar with bacteriological technic. Attempts to determine the value of various methods of examination and to arrive at standard procedures are commendable. Methods quite suitable for research may not be suitable for routine control work. Time is an important factor since in control work it is essential to have results as quickly as possible.

As indicated by the title, only fresh and frozen fruits and vegetables are considered in this paper. It is proper to ascertain the actual bacteriological condition of such foods as they appear on

the market, in order to determine whether there is a need for control work.

FRESH FOODS

Fresh foods may be heavily seeded with various types of microorganisms which are picked up from the soil, dust, and agents with which they come in contact. A complete review of literature need not be attempted here. That pathogenic bacteria might be disseminated by fresh fruits, has been shown by Ehrlich,¹ Abbott,² Rommel,³ Ressel,⁴ Neumann,⁵ Clauditz,⁶ Sartory and Fillassier,⁷ and others. Sartory and Fillassier examined fruits exposed for sale on Paris fruit stands. Numerous saprophytic species were found to be present, most of which could be removed by careful washing. Garcia⁸ found *Escherichia coli* to be always present on common fruits (apples, lemons, oranges, and bananas). Such data indicate that undesirable bacteria may be present and justify health officers and state and federal inspectors in exercising vigilance to insure sanitary fresh foods. Smeall⁹ has quite recently suggested that some of the minor gastrointestinal disturbances common during the fruit eating season may be due to bacteria on fruit and not to the fruit itself.

Attempts have also been made to study the problem by determining the longevity of certain pathogenic bacteria on the surface of fruits. Ko¹⁰ was able to isolate *Eberthella typhi* for a considerable time from fruit which had

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been sprayed with pure cultures. Whether the natural fruit juices are bactericidal, seems to have had little study. Ko found that, in general, the acid juices were destructive; juices from partially ripened fruit were more germicidal than those from fully ripened fruit. Smeall⁹ reported that *Eberthella typhi* remained viable for 68 days on the surface of dates.

In general, fresh vegetables present greater sanitary problems than fresh fruits. Vegetables are raised in soil where they are subjected to greater possibilities of contamination. Wurz and Bourges¹¹ reported dissemination of pathogenic bacteria by vegetables grown in polluted soil or watered with infected water. Typhoid fever is said to increase every year in Paris¹² during the late summer months, most of it being attributed to fresh vegetables grown on sewage farms. While the original purpose of such lands was for raising hay, or for orchards and pastures, excellent crops soon stimulated their use for garden truck, much of which is eaten raw. Every precaution should be taken to insure that fresh vegetables are harvested from unpolluted soil for many of them are eaten without cooking. Creel¹³ observed no relation between the appearance of the vegetables and the presence of *Eberthella typhi*. Vegetables which seemed to be clean to the naked eye, were found to harbor the organism.

Epidemics of communicable diseases have been traced frequently to infected fresh vegetables. It is necessary, therefore, to know something of the conditions under which such foods are raised. Kurk¹⁴ examined the microbial condition of vegetables bought on the open market in Chicago. He particularly tried to find members of the colon-typhoid group, streptococci, and anaerobic bacteria. *Escherichia coli* was found on 22 of 29 samples of watercress, celery, and lettuce. James¹⁵

more recently studied fresh head lettuce and reported many more bacteria on the exterior of the head than in the interior. His work again showed the value of controlled conditions of storage and handling.

Just how much significance should be given to the presence of lactose-fermenting bacteria on the foods under discussion is open to argument. No information seems to be available on which to base an opinion. It is very doubtful whether they may serve as indicators of pollution of fresh foods in the same manner as they do of water.

Murillo¹⁶ incorporated pathogenic bacteria in garden soil by spraying the soil and food products grown thereon. Virulent organisms were found after 36 days in soil and after 55 days in sterile sand. Such data indicate appreciable longevity in soil. Melick¹⁷ found that longevity of *Eberthella typhi* in soil depended on the source and strain, the time varying between 29 and 58 days. Under natural conditions radishes were infected after periods of 28, 35, and 37 days. Garden soil inoculated with typhoid excreta yielded viable *Eberthella typhi* for 41, 34, and 35 days in three experiments. Melick was forced to the conclusion that fresh vegetables raised on polluted soil may be unsafe. Furthermore, the ordinary methods of preparation for the table might not render them safe.

These conclusions of actual experiments seem to be borne out by epidemiological experience. Wary¹⁸ reported an epidemic of typhoid fever in a London suburb attributed to watercress grown in beds fertilized with sewage. Another outbreak of 18 cases of typhoid fever traced to watercress sandwiches was reported from Philadelphia.¹⁹ Pixley²⁰ attributed 2 cases of typhoid fever to uncooked rhubarb. Mores²¹ believed that 49 cases of typhoid fever in an insane hospital had been caused by eating celery which had

been irrigated with sewage. Since it is known that some of our pathogenic microorganisms are quite hardy, they may be expected to survive during the commercial age of fresh foods.

Bacteria apparently do not penetrate the interior of sound fruits and vegetables. Mills, Bartlett and Kessel²² made such observations with vegetables using bacteria and particles of carbon. They adhere to the surface and may be removed by the procedures used in preparing them for the table. That these procedures may not always be reliable has been suggested by Melick.¹⁷ It is safer to prevent contamination than to rely on procedures in the kitchen to avoid infection. The superimposition of careful washing on fresh foods raised under satisfactory conditions, gives foods which harbor minimum amounts of foreign matter, including microorganisms. It has been pointed out above that vegetables which appear to be clean, may harbor pathogenic bacteria.

FROZEN FOODS

Frozen or frosted foods have assumed an important place on the American market. While this method of preservation has been used for decades, only during the last one, has it been extended to a wide variety of foods. Public health aspects of frozen foods were discussed by Fellers in 1931. At that time, there were few reports of experimental work in the literature and not much was known about the microbiological condition of such foods, and some of the foods now being frozen were not so preserved when Fellers prepared his paper. Since then, results of several extensive investigations have been reported and some of the conclusions which Fellers had to reach by analogy are now supported by experimental work. The discussion by Fellers dealt adequately with some of the general health problems, such as raw materials,

effect on nutritive values, etc. It is my intention to consider some of the newer findings. It should be stated that this is done with no prejudice against such foods. They are probably as safe as fresh foods, if properly handled and kept frozen until used. Frozen foods must endure the same analysis that foods preserved by other methods have in the past. If they are considered to be perishable and perhaps more susceptible to attack by microorganisms than are fresh foods, and are handled accordingly, they will be satisfactory foods.

Several different positions have been assumed by those engaged or interested in the development of the frozen food industry. One of them is that little attention need be given to the sanitary features because to date they have not caused infections or intoxications. Those who assume this position believe that harm is done the industry by such discussions. Such a position is untenable and violates the simplest and most fundamental laws of epidemiology. Application of such logic to the entire field of public health would lead to chaos, and discredit the public health officer. Dr. Hurty's homely poem on page 796 of the August, 1933, *JOURNAL*, "The Fence or the Ambulance," aptly expresses the situation. In this case it is better to erect fences and keep them in repair than to neglect them and have to call the ambulance. It is better to prevent trouble than to cope with it after it has appeared. The fence in this case is so easy to construct—simply sound raw materials, properly and completely frozen, and kept frozen until used by the consumer. The frozen food industry must decide whether it is willing to assume the losses which might result from improper handling of frozen food. The ripe olive industry was ruined for a number of years after the outbreaks of botulism which were traced to it. Even today, about 15 years after

the spectacular Canton, Ohio, outbreak, the ripe olive is viewed with suspicion by some laymen. Nothing is to be gained by refusing to face these hazards. On the other hand, a finer and safer food will be available if they are faced and everything done to prevent spoilage.

There has been a tendency in some quarters to compare frozen or frosted foods to other preserved foods without considering the differences which obtain. Other preserved foods may have received special treatment to destroy bacteria or repress their development. The situation with respect to frozen foods is much different. Even after storage for some time in the frozen state, they contain innumerable microorganisms in some cases, and are subject to fairly rapid spoilage after thawing. Frozen foods, like fresh foods, are perishable and must be stored under proper conditions. Here defects in quality of frozen foods may occur. Deterioration and possibility of causing food poisoning, remote as they may seem, are possible in any food in which there is a varied flora.

Freezing does not destroy microorganisms. A review of the literature of the effect of freezing on microorganisms prepared by Wallace and Tanner appears in the October and December, 1933, issues of *The Fruit Products Journal* and *American Vinegar Industry*. This survey shows beyond reasonable doubt that, while freezing does materially reduce the number of viable bacteria in some cases, it by no means destroys them. Among those which remain, may be microorganisms of considerable significance. Prescott, Bates, and Highlands,²³ and Fellers²⁴ reported appreciable numbers of viable bacteria in various frozen foods. Geer, Murray, and Smith²⁵ have recently reported satisfactory reductions in the bacterial content of Hamburg steak after freezing and storage. In the author's laboratory extensive investiga-

tions have been under way for several years on the microbiology of frozen foods, including the analysis of over 2,000 cans and cartons of frozen fruits and vegetables packed under commercial conditions. Reports on this work will shortly be published.³⁷ It seems sufficient here to report only some of the general conclusions reached. The original microbial content of the frozen foods seemed to depend largely on the condition of the raw materials. When over-ripe, blemished, raw materials were used, the content of microorganisms was high; when sound raw materials were used, the content was low. There were some instances where a container from a low count pack, contained many more microorganisms than the others. This was probably due to the presence of small amounts of decomposed food. One bad berry, for instance, might seed an entire pack or container. A fairly high content of microorganisms apparently has little influence on quality as long as the food is frozen solid, for there is no satisfactory evidence that bacteria grow under such conditions.

Freezing caused a steady decrease in the number of viable bacteria. After a year's storage, viable bacteria had decreased about 90 per cent. The number of viable forms seemed to reach a basic minimum from which it decreases very slowly. Apparently those forms which are unable to tolerate the conditions in frozen foods die out rapidly during the early period of storage.

To study the effect of freezing on the organisms themselves under conditions as nearly like those obtaining in foods, Wallace and Tanner²⁶ froze 16 different pure cultures of microorganisms, including yeasts, molds and bacteria in 16 different menstrua-nutrient broth with 5 different hydrogen ion concentrations, 3 different concentrations of salt and sugar, and in 2 fruit juices. The suspensions in ampoules were stored at

—23.3° C. (—10° F.), and counts of viable cells made at monthly intervals. In all cases there was a rapid drop in numbers during the early periods of storage. Spore forming bacteria were more resistant. After the 8th month the number of viable cells dropped very slowly. These ampoules have now been in storage for almost 3 years and still show many viable bacteria.

In order to determine whether very low temperatures might not be more destructive, bacterial suspensions were stored at —15° C. (3.2° F.), —40° C. (—40° F.) and —80° C. (—112° F.). The differences due to these temperatures were not pronounced. In fact even the lowest temperature employed, —80° C., did not seem to cause much more rapid or greater destruction than the higher ones.

It should be pointed out that the results of freezing on microorganisms, expressed in percentage reduction of viable forms may be meaningless. The important problem is the number of viable forms remaining. The fallacy of interpreting too much into percentage reductions is well illustrated by Table III in a paper by Geer, Murray, and Smith²⁵ on the bacterial content of frosted Hamburg steak. Two samples were reported as having 1,200,000 bacteria per gm. after freezing and storage. One showed a 57.1 per cent reduction, the other a 40 per cent. A 99 per cent reduction in viable microorganisms might leave many bacteria in the food.

The types of spoilage caused by microorganisms in thawed frozen foods are not unlike those in fresh foods. Whether thawed foods are more susceptible to spoilage has not been adequately studied. Berry²⁷ reported that yeasts were largely destroyed in frozen fruits and that when the cans were stored at room temperature, only a few swelled. Wallace and Tanner²⁶ found that frozen fruits packed in tin

swelled and in many cases burst the cans. Yeasts are quite resistant to freezing, as shown by Tanner and Williamson.²⁸ Observations made in the author's laboratory during the past 3 years do not confirm Berry's observations. Yeasts have been so abundant in some thawed frozen fruits that they burst the containers.

The fact that frozen foods do not receive treatment which will free them of microorganisms makes it necessary to give more attention to raw materials and conditions under which they are prepared than is the case with certain other preserved foods. Attention should be given to quality of the water supply and the health of those engaged in the preparation of such foods. A carrier would be a menace. Sufficient attention is apparently given these matters in the frozen meat and fish industries, but this may not always be the case in the frozen fruit and vegetable industry. Concentration of hundreds of fruit pickers from different sections of the country in camps during cherry picking time might introduce hazards which would be of no significance in other food industries. To secure information on the possible dissemination of such diseases as typhoid, and paratyphoid fevers by frozen fruits, fresh cherries and cherry juice in tin cans were inoculated with *Eberthella typhi*, *Escherichia coli*, *Salmonella aertrycke*, *Salmonella schottmülleri* and *Proteus vulgaris*. The cans were closed, tipped under 26 inches of vacuum, their exteriors disinfected, and stored at —17.8° C. (0° F.) and —40° C. (—40° F.). Uninoculated controls were stored under the same conditions. The results of these experiments were reported by Wallace and Park.²⁹ In the cherry juice alone, the organisms did not survive longer than 4 weeks. In frozen cherries the survival period was from 2 to 3 months. Such data justify attention to sanitary

quality of water and medical inspection of employees, for cherries might be used promptly after freezing. Heavier inoculation with more cold resistant strains than those used might tend to greater longevity.

The other problem has to do with the presence and behavior of toxicogenic anaerobes under the conditions which obtain in frozen foods. Some of those engaged in the frozen food industry have stated that it was hard to see that there was the slightest danger from the consumption of thawed frozen fruits, even under the most careless handling. It has been stated that it was common practice to allow frozen fruits to remain on counters during the day and later return them to an ordinary icebox at night, and further, that under these conditions, a large number of the cartons must have begun to ferment prior to their sale. Such careless methods of handling a perishable food should not be permitted, as they would greatly affect the quality and introduce hazards of food poisoning which may easily be avoided by proper handling. To hold that there is no danger is a questionable attitude. It probably originates from experiments with canned foods. It is generally assumed that a food more acid than pH 4.5 is free from botulism hazard. The growth of other organisms might interfere with the protective action of foods with pH 4.5, as has been shown to be the case.

Development of sufficient toxin to kill guinea pigs in a few of the fruits has been explained by concomitant development of other organisms, especially molds, making it possible for *Clostridium botulinum* to grow. Several reports confirm this explanation. Chief among them are those of Meyer and Gunnison,²⁰ and Stone.²¹ The former reported an outbreak of botulism caused by Bartlett pears the pH of which was 3.86. Development of toxin in Bartlett pear syrup was made possible by

concomitant development of a yeast and a member of the lactic acid group. This spoilage so altered the pH of the pear syrup that *Cl. botulinum* was able to grow. Stone reported an outbreak of botulism caused by persimmons, the pH of which was 5.6. Wallace and Park observed toxin formation when a yeast and acid producing bacterium were growing in the medium.

The wide distribution of *Cl. botulinum* in the soil of the areas where fruits and vegetables are frozen on a large scale is an important factor. The organism is also known to be present in the soil of practically all states as evidenced by outbreaks of botulism and examination of soil samples.

In some quarters it has been argued that packing of frozen foods in paper cartons might eliminate the danger of botulism. It was suggested that air would enter such packages and prevent development of anaerobic bacteria. The fallacy in such an argument is apparent to bacteriologists. Anaerobic conditions could easily be present in a food mass exposed to the open air. The fact that a package is not hermetically sealed is no indication that anaerobic conditions might not exist.

Effect of Freezing on Botulinum Spores—It is generally accepted that freezing does not sterilize a suspension of bacteria. The spores of *Cl. botulinum* have also been shown to be resistant to freezing. They are viable, therefore, and appear in the thawed frozen foods to compete with the other bacteria which have survived the cold. The subject has been studied in several laboratories with somewhat discrepant results. Berry²⁷ considers the possibility of botulism from thawed frozen foods to be very slight. His arguments are apparently that the foods would have taken on such appearances of decomposition that they would not be eaten, and that frozen foods are usually cooked before eating. These are as-

sumptions which do not seem to be supported by facts. As far as the first one is concerned, experience with botulism from canned foods has been just the reverse. Geiger, Dickson, and Meyer³² discussed this question in *The Epidemiology of Botulism*. They reported that in many outbreaks the spoilage of the preserved product was so striking as to attract the attention of the person opening the can; yet the foods were served. With regard to cooking of frozen pack vegetables, this may be the rule, but it is conceivable that they might be used uncooked.

Results of several investigations have been published to show that the spores of *Cl. botulinum* are not destroyed by freezing and storage in the frozen condition for rather long periods. Wallace and Park³³ observed viable spores after a year at -16°C . (3.2°F). James made the same observation.

Effect of Freezing on Toxin of Cl. botulinum—The toxin of *Cl. botulinum* is not destroyed by freezing. Wallace and Park reported potent toxin after 1 year's storage at -16°C . (3.2°F). James reported that freezing and defrosting 15 times did not reduce the strength of toxin.

Development of Cl. botulinum in Thawed Frozen Foods—Having shown that freezing does not destroy *Cl. botulinum* or its toxin, the next problem is to determine the behavior of the anaerobe in thawed frozen fruits and vegetables. To be safe and of high quality, frozen foods should be kept frozen until used. This is not done by all who are merchandising these products. Several years ago frozen fruits were exposed for sale on the counter in Chicago drug stores. As stated, we have the word of one engaged in the frozen food industry that the cartons are frequently not kept frozen during their sojourn in the retailer's establishment. Berry's experience in the Northwest is somewhat dif-

ferent from that in other sections. Of 20 cans of blanched peas and 10 cans of unblanched string beans inoculated with *Cl. botulinum* spores 15 to 18 months previously, none proved toxic either on thawing or on standing at room temperature for from 3 days to 3 weeks.

This has not been the experience in our laboratory as reported by Wallace and Park. It has been demonstrated in our laboratories that occasionally *Cl. botulinum* may develop in thawed frozen foods and produce its toxin. Vegetables are especially susceptible whether packed in glass or tin containers.

The results of these investigations correlate well with those reported by Straka and James.³⁵ They reported the presence of Types A and B of *Cl. botulinum* in inoculated frozen peas packed in various types of containers; showed that freezing did not destroy *Cl. botulinum*; and that frozen vegetables (peas) which contain it may become toxic after thawing. Berry stated that there is practically no danger from frozen foods.* James has shown that the toxin is not materially reduced in potency.

Having discussed the microbial condition of fresh and frozen foods, just how far may bacteriological technic be used in their control? It is difficult to see a place for the bacteriologist here, much as the food bacteriologist might wish it. It would be impossible to examine bacteriologically all shipments of such products. Negative results would be meaningless with some of our present

* Since the preparation of this paper, Berry (*J. Bact.*, 26:459, 1933) published a report of experimental work in which he demonstrated survival, for at least 2 years, of lactic acid bacteria in frozen peas. Persistence of these organisms was believed to be of public health significance in that they might exert an antagonistic influence on food poisoning bacteria. Frozen foods are not sterile and organisms which favor bacteria of the food poisoning group might be present as well as those which have been found to inhibit them.

methods. Much more may be done by careful inspection of conditions under which such foods are produced and handled. This is becoming of greater importance for fresh foods shipped into this country that may not be raised under sanitary conditions, and it is apparent that bacteriological methods may not be used for control.

Certain other foods are in about the same situation. The Bureau of Animal Industry does not examine the flesh of all hog carcasses for *Trichinella spiralis*, because it would be too expensive, if not impossible. In place of this it prescribes conditions under which the meat shall be handled to rid it of the parasite. A similar attitude must be taken toward the foods discussed in this paper.

Bundesen³⁶ reached the same conclusion in 1925 after weighing the evidence gathered in an epidemiological investigation of typhoid fever in Chicago. He stated that bacteriological examination of fruits and vegetables had not proved of any value. In the majority of instances, *Escherichia coli* was found, but it was impossible to determine its origin—whether it was of human origin or derived from the soil. In 1 case high colon counts of a shipment of lettuce were traced to ice used for packing.

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The Detection of Carriers Among Food Handlers in Connecticut*

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THE idea of subjecting certain groups of food handlers in Connecticut to physical and laboratory examinations took definite shape in 1927, shortly after an extensive outbreak¹ of septic sore throat among consumers of milk from a dairy producing a grade of milk designated in Connecticut as "certified." Since that time statistics have accumulated on 91,257 examinations of milk-handler specimens over a period of 77 months. Certainly sufficient data have been amassed on nearly 100,000 examinations in over 6 years to justify an analysis and to render possible an impartial evaluation of the laboratory results.

This study is not concerned with the physical examinations which are made by physicians employed by the producers. Our main purposes in this discussion are to outline Connecticut requirements for food handlers, to describe the methods used in the Bureau of Laboratories of the State Department of Health and to demonstrate by our experiences the general usefulness, importance, and relatively low cost of routine laboratory examinations of specimens from food handlers when conducted in a central laboratory doing a large volume of work.

DEFINITION OF TERMS

For a clear understanding of this paper certain terms must be defined. The term "food handler" will be used in its broadest sense to include all persons engaged in the production and handling of food until prepared for the ultimate consumer. The terms "milk handler" and "oyster handler" will be used to differentiate between particular groups of food handlers. The term "carrier" will be used broadly to include all persons harboring organisms capable of causing diseases spread by food, regardless of the permanence of the carrier state. Particular attention will be paid to carriers of certain diseases: diphtheria, scarlet fever, septic sore throat, tuberculosis, typhoid and paratyphoid fevers, and to milk as a potential disease vector.

Of the 3 grades of milk to which we shall refer, only one, "pasteurized," is self-descriptive. The other two, "certified" and "grade-A raw," are defined² in regulations of the Connecticut Milk Regulation Board, an official state body. The term, "certified," in Connecticut, does not indicate milk produced under the requirements of a medical milk commission but is defined as milk having a standard plate count of not more than 10,000 bacterial colonies per ml. and produced from tuberculin-tested cows in a dairy approved by the Connecticut Milk Regulation Board as fulfilling exacting requirements in regard to physical equip-

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ment, handling methods and health of handlers and cows. Grade-A raw milk in Connecticut is produced from tuberculin-tested cows under specifications less stringent than those for "certified" milk. It must have a standard plate count of not over 75,000 bacterial colonies per ml. with an average standard plate count of not more than 40,000 bacterial colonies per ml. for 3 successive samples. The ordinary grade of milk consumed raw by a large percentage of the population will be referred to in this discussion as "ungraded raw milk."

CONNECTICUT REQUIREMENTS

The rules specified in the Sanitary Code³ for release of cases from quarantine and for release of carriers apply to food handlers as well as to other individuals. No food handler may return to work after an attack of a communicable disease until the requirements for release from quarantine or isolation have been fulfilled.

Economic factors operate to make it imperative for health authorities to select certain key groups of food handlers for periodic laboratory examination. The primary aim in making this selection should be to protect the largest possible number of persons to the greatest possible extent from food-borne diseases spread by carriers who handle foods not susceptible to adequate supervision by other methods. Obviously, certain foods serve as disseminators of disease more often than others. Milk is a classical example. Being a liquid, it soon becomes completely invaded by any contaminating microorganisms introduced in the handling process. Furthermore, it serves as an admirable medium for the propagation of bacterial life. Its consumption is more general than any other single food and it is ordinarily ingested by all age groups without any treatment after delivery.

Reports of results of examining large numbers of specimens from food handlers are scarce in the literature. Osborn and Beckler⁴ in a survey of typhoid carriers among food handlers in Massachusetts listed 21 milk handlers who had caused 426 cases, an average of 20.3 cases per carrier. Twenty carriers among other types of food handlers caused 56 known cases, an average of only 2.7 cases per carrier. These other types of food handlers were not especially varied but included cooks, maids, housewives, nurses, and icemen. The highest case-to-carrier ratio, 7.3, among these sub-groups was for cooks. From these considerations it is evident that handlers of milk, and other foods presenting hazards nearly as great, are logical selections for laboratory control work.

The only classes of food handlers subjected to special requirements in Connecticut are oyster handlers and handlers of certified, grade-A raw and pasteurized milk. The Sanitary Code requires⁵ that each person engaged in "opening, handling or packing shucked oysters" must be examined annually to determine the absence of organisms of typhoid and paratyphoid fevers in a stool and a urine specimen before he can secure a certificate from the State Department of Health permitting him to obtain employment. Further laboratory examinations must be made after any suspected attack of typhoid fever.

The Connecticut Milk Regulation Board requires the making of laboratory tests of body discharges of all handlers of certified and grade-A raw milk before beginning employment to determine the absence of the organisms of typhoid fever, paratyphoid fever, tuberculosis, diphtheria or streptococcus sore throat. Handlers of certified milk must be reexamined monthly with the inclusion of laboratory tests. These regulations have been supplemented by an executive order of the State Dairy and

Food Commissioner, effective July 1, 1931, requiring additional laboratory tests on handlers of grade-A raw milk at least once every 6 months and laboratory tests on all handlers of milk in pasteurization plants at least once a year.

SYNOPSIS OF LABORATORY METHODS

In all instances the State Department of Health has been given power to designate the laboratory tests necessary. At present these tests consist of the following examinations: Throat and nose swabbings for *Corynebacterium diphtheriae* and hemolytic streptococci; sputum for *Mycobacterium tuberculosis*; feces and urine specimens for the organisms of typhoid and paratyphoid fevers; and blood for agglutinins for typhoid and paratyphoid organisms. The blood tests are required only at the time of the first examination but in actual practice most examining physicians submit specimens for agglutination tests at every examination, except on handlers of certified milk, in which case Widal tests are requested on the average of once a year. Specimens ordinarily reach the Laboratories within 24 hours after collection.

Diphtheria—Four cultures on Loeffler's medium are examined routinely. Two of these cultures are from nose and throat swabbings respectively, which have been planted by the physician; the other 2 are planted in the laboratory, 1 from the nose and 1 from the throat swab. A microscopical examination, using Kinyoun's stain, is made after overnight incubation.

Diphtheria Virulence Test—When a nose or throat culture is found to contain organisms morphologically resembling *Corynebacterium diphtheriae*, an intradermal virulence test is made, using the guinea pig as test animal. Tests are made with a suspension of whole culture in salt solution and the appearance of a distinct, typical, necrotic area

is used as the criterion for a positive test.

Hemolytic Streptococci—As the most expedient procedure available for routinely complying with the requirements of the Milk Regulation Board for determining "by laboratory tests" that a milk handler "does not harbor the germs of streptococcus sore throat," swabbings received from the nose and throat of each person are streaked on blood-agar plates prepared from whole, defibrinated sheep blood. Only organisms that give the true beta type of hemolysis and show typical chain-formation microscopically are considered positive; all others are disregarded. Enrichment methods for the isolation of hemolytic streptococci are not included in this routine examination since these methods are too time-consuming for our present personnel to handle. Statements ^{6, 7, 8} occur in the literature that hemolytic streptococci, when recovered in practically pure culture from the throat or nose, have diagnostic significance. Public health laboratories have somewhat generally made use of this procedure routinely. The presence of streptococci giving a true beta type of hemolysis in the throat or nose of a milk handler is considered sufficient reason for removing him from contact with a milk supply until negative tests are obtained without making biochemical, serological, or further morphological studies. Moreover, an attempt to differentiate routinely between various species, groups or strains of beta hemolytic streptococci would be an unnecessarily costly refinement in the light of our present knowledge unless undertaken as a research problem. From an epidemiological viewpoint the effect of this procedure is to give the public the benefit of the doubt as to the relationship of these organisms to scarlet fever and septic sore throat.

Tuberculosis—Sputa from milk handlers are concentrated and smears of the

TABLE I
NUMBER OF VARIOUS KINDS OF LABORATORY EXAMINATIONS ON MILK HANDLER SPECIMENS AND NUMBER OF POSITIVE EXAMINATIONS ANNUALLY, APRIL, 1927, TO AUGUST, 1933, INCLUSIVE

Kind of Examination	Number of Examinations								Number of Positive Examinations							
	1927 (Apr.- Dec.)	1928	1929	1930	1931	1932	1933 (Jan.- Aug.)	77-Month Period, Apr. 1927- Aug. 1933	1927 (Apr.- Dec.)	1928	1929	1930	1931	1932 (Jan.- Aug.)	1933 (Jan.- Aug.)	77-Month Period, Apr. 1927- Aug. 1933
Typhoid Widal's	150	67	42	325	684	823	663	2,754	0	0	0	0	12	39	9	60
Paratyphoid A Widal's	150	67	42	325	684	823	663	2,754	0	0	0	0	0	0	0	0
Paratyphoid B Widal's	150	67	42	325	684	823	663	2,754	0	0	0	0	0	1	0	1
Feces and Urines for Typhoid	1,357	1,339	1,159	2,039	3,128	3,473	2,706	15,201	0	0	1	0	1	1	1	4
Feces and Urines for Paratyphoid A	1,357	1,339	1,159	2,039	3,128	3,473	2,706	15,201	0	0	0	0	0	0	0	0
Feces and Urines for Paratyphoid B	1,357	1,339	1,159	2,039	3,128	3,473	2,706	15,201	0	0	0	0	0	1	2	3
Throat and Nose Cultures for Diphtheria	1,376	1,543	1,444	2,252	3,060	3,506	2,223	15,404	40	17	16	40	52	12	6	183
Diphtheria Cultures for Virulence Test	31	14	10	38	47	8	5	153	0	0	0	2	5	0	0	7
Throat and Nose Cultures for Hemolytic Streptococci	1,118	1,342	1,440	2,136	2,828	3,287	2,051	14,202	2	10	0	2	24	7	28	73
Sputa for Tuberculosis	687	763	696	1,085	1,450	1,602	1,350	7,633	1	0	0	3	2	1	0	7
Totals	7,733	7,880	7,193	12,603	18,821	21,291	15,736	91,257	43	27	17	47	96	62	46	338

sediment stained by the Ziehl-Neelsen technic with subsequent microscopical examination.

Feces and Urine for Enteric Organisms—Specimens of feces are collected in vials containing a 30 per cent solution of glycerol in 0.6 per cent salt solution. Urine specimens are collected in clean, sterile vials. Organisms are isolated by streaking the specimens on brilliant-green agar and eosin-methylene-blue agar plates in a manner designed to give well separated colonies. Examinations for typhoid and paratyphoid organisms are routinely reported whether positive or negative. Dysentery and food-poisoning organisms are reported only when found. All suspected organisms are subjected to thorough morphological, biochemical, and serological tests before a report is made.

Widal Tests—Either macroscopic or microscopic Widal tests are made according to the amount of blood received for the test. In either case serial dilutions of the serum are made. Living suspensions of 24-hour agar-slant cultures are used as antigen in the macroscopic tests to assure the presence of both H and O agglutinogens. A living 15- to 18-hour broth culture is used as antigen in the microscopic tests. After mixing the diluted serum with the antigen, macroscopic tests are incubated for 3 hours at 55° C. and subsequently overnight in the refrigerator. Hanging-drop preparations for microscopic tests are incubated for 30 minutes at 37° C. before reading. Tests are made for typhoid, paratyphoid A and paratyphoid B agglutinins.

LABORATORY FINDINGS ON MILK HANDLERS

From April, 1927, to August, 1933, inclusive, a total of 91,257 specimens were examined from handlers of certified, grade-A raw and pasteurized milk. Table I shows the numbers of the

various types of examinations and the positive examinations, annually. The total of 338 positive results would be definitely misleading if not subjected to analysis and discussion. The number of positive Widal (agglutination) tests for typhoid, paratyphoid A and paratyphoid B may be dismissed at once with the statement that a positive result has never in our experience led to the subsequent detection of a carrier among this group of milk handlers. Although 6 carriers of typhoid and paratyphoid organisms have been detected in the same period of time, 4 of them gave negative Widal tests, and no Widal specimens were submitted on the other 2.

The actual number of individual carriers of organisms of milk-borne diseases detected annually is shown in Table II. Under the heading "Diphtheria" only virulent cultures are listed, representing just the "carrier" fraction of 183 positive examinations for *Corynebacterium diphtheriae* on 140 individuals. One of these cultures (1932) was not examined for virulence because, shortly after the examination was reported, it was found to be from a clinical case.

The net result of 91,257 examinations in 77 months has been to remove 71 persons, potential foci of infection, from active participation in milk handling, either permanently or until cessation of the carrier state. These individuals have included 8 carriers of virulent diphtheria organisms, 50 of beta hemolytic streptococci, 7 of tubercle bacilli, 4 of typhoid organisms and 2 of paratyphoid B bacilli. To the best of our knowledge, none of these was detected otherwise than by laboratory tests.

LABORATORY EXAMINATIONS ON OTHER FOOD HANDLERS

In Table III are presented laboratory examinations on persons known to

TABLE II

NUMBER OF INDIVIDUAL CARRIERS DETECTED ANNUALLY BY ROUTINE EXAMINATIONS
OF MILK HANDLERS

Year	Diphtheria	Hemolytic Streptococci (Beta Type)	Tubercu- losis	Typhoid	Para- typhoid A	Para- typhoid B	Totals
1927 (Apr.-Dec.)	0	2	1	0	0	0	3
1928	0	7	0	0	0	0	7
1929	0	0	0	1	0	0	1
1930	2	2	3	0	0	0	7
1931	5	19	2	1	0	0	27
1932	1	5	1	1	0	1	9
1933 (Jan.-Aug.)	0	15	0	1	0	1	17
Totals	8	50	7	4	0	2	71

be food handlers (exclusive of handlers of certified, grade-A raw and pasteurized milk) extending from January, 1931, through August, 1933. The 11 individuals giving positive feces or urine specimens for typhoid organisms were all carriers, not cases, and each had been implicated as the infecting agent either in 1 or in a very few cases of typhoid fever. Thus in less than 3 years 11 carriers have been located on investigation of sporadic cases of typhoid, a fact which more than ever indicates the important rôle of the carrier in sporadic typhoid fever. Two of the 3 positive examinations for bacillary dysentery were from a single carrier who had caused a small outbreak of dysentery in an educational institution⁹; no history was obtained on the other positive examination.

Of the total of 3,176 examinations recorded in Table III, 1,869, or more than half, have been made on feces and urine specimens from oyster handlers in

fulfillment of requirements of the Sanitary Code of Connecticut. None of these were positive. However, they represent a very small group of food handlers, as not more than 125 individual oyster handlers have been examined in any one year. Although this group is small, the detection of a typhoid carrier within the group would be of importance not only to the State of Connecticut but to any community into which shucked oysters are shipped so that the small expense involved certainly seems justified. Since the beginning of 1931 the cost has never exceeded \$750 per annum on the basis of cost data which will be presented later. It should be noted here that 6 carriers had been detected¹⁰ among oyster handlers prior to the examinations recorded in Table III. One paratyphoid A and 4 paratyphoid B carriers were found in 1925 and a typhoid carrier was discovered in 1926.

The other individuals giving the

positive tests shown in Table III were mostly clinical cases. Nevertheless, the finding of tubercle bacilli in the sputa of 14 individuals in this group has given the local health authorities definite grounds for removing these persons from contact with food to be consumed by others.

COST OF LABORATORY WORK ON MILK HANDLERS

The best figure available for estimation of the total cost of making milk-handler examinations is the average cost per annum of an examination in the entire Bureau of Laboratories, translated from a fiscal to a calendar year basis. Such records have been carefully compiled and discussed in the annual reports of the Bureau¹¹ for several years. They apply only to this particular laboratory over the period specified. Because some types of examinations included in the work of our Laboratories are much more time-consuming than are most of the milk-handler tests, they naturally tend to make the "average cost per examination" figure somewhat greater than it would be if based on milk-handler tests alone. Examples are the complicated series of tests necessary in the sanitary chemical examination of a water or the classification of an unusual pathogen. Therefore, the authors maintain that the cost of milk-handler examinations as estimated on this basis is considerably higher than the actual cost has been so that any error is definitely on the side of conservatism.

Unit cost figures obtained in the manner just described are the basis for Table IV which shows the annual cost of laboratory examinations on milk handlers, and another significant figure for each year—the cost of detecting each carrier found in this group. The unit cost of locating each one of the 71 carriers from 91,257 laboratory ex-

aminations has been \$677, or a total expenditure of \$48,048 in 77 months.

The estimated population of Connecticut,¹² as of July 1, 1932, was 1,656,572. The cost for laboratory work on milk handlers given in the table for that year was \$10,858. A short calculation gives for these milk-handler examinations in 1932 a per-capita cost of approximately 2/3 cent.

The number of quarts of the various grades of milk produced daily in Connecticut according to statistics gathered by the State Dairy and Food Commissioner for one day in May of this year are as follows: certified 9,234; grade-A raw 22,249; pasteurized 415,000; and ungraded raw 324,747. This gives a total of 771,230 quarts of milk produced daily. These figures do not take into account probably 18,000 quarts of milk produced daily outside of the state but bottled in Connecticut or perhaps 65,000 quarts of milk produced in Connecticut and bottled after shipment outside of the state. It was impossible to secure figures on the amount of milk produced in Connecticut not used as fluid milk. Of the total milk supply, therefore, certified represents 1.2 per cent; grade-A raw, 2.9 per cent; pasteurized, 53.7 per cent; ungraded raw, 42.2 per cent. Assuming the per capita consumption of all grades of milk to be the same and the consumption to be evenly distributed among all persons in the state, these figures will then serve equally well as estimates of the percentages of the total population consuming the various grades of milk. The population of Connecticut, estimated¹³ as of July, 1933, was 1,678,647. Therefore, the probable number of consumers of the different grades of milk in Connecticut is as follows: certified, 20,144; grade-A raw, 48,681; pasteurized, 901,433; ungraded raw, 708,389.

Under existing requirements, there-

TABLE III
LABORATORY EXAMINATIONS OF SPECIMENS FROM FOOD HANDLERS, OTHER THAN MILK HANDLERS,
JANUARY, 1931, TO AUGUST, 1933, INCLUSIVE

Kind of Examination	1931			1932			1933			32-Month-Period January, 1931- August, 1933		
	Total Exami- nations		Number of Indi- viduals Positive	Total Exami- nations		Number of Positive Exami- nations	Total Exami- nations		Number of Positive Exami- nations	Total Exami- nations		Number of Indi- viduals Positive
	Positive Exami- nations	Indi- viduals Positive		Positive Exami- nations	Indi- viduals Positive		Positive Exami- nations	Indi- viduals Positive		Positive Exami- nations	Indi- viduals Positive	
Throat and Nose Cultures for Diphtheria	162	4	4	126	0	0	126	3	2	414	7	6
Diphtheria Cultures for Virulence	3	0	0	1	0	0	1	0	0	5	0	0
Throat and Nose Cultures for Hemolytic Streptococci	140	6	6	115	7	6	99	2	2	354	15	14
Sputa for Tuberculosis	23	2	2	54	8	8	38	4	4	115	14	14
Feces and Urines for Typhoid	221	3	1	327	11	5	185	20	5	733	34	11
Feces and Urines for Paratyphoid A	221	0	0	327	0	0	185	0	0	733	0	0
Feces and Urines for Paratyphoid B	221	0	0	327	0	0	185	0	0	733	0	0
Feces and Urines for Bacillary Dysentery	46	2	1	16	1	1	20	0	0	82	3	2
Feces and Urines for Food-Poisoning Organisms	1	0	0	0	0	0	6	0	0	7	0	0
Totals	1,038	17	14	1,293	27	20	816	29	13	3,176	73	47

fore, 970,258 persons—only 57.8 per cent of the total population of the state—are benefitting from the protection afforded by the routine laboratory examinations now being made periodically on milk handlers. On the basis of the estimated cost of milk-handler examinations during the first 8 months of 1933, the cost for the entire year will not exceed \$20,000 and will probably be much less. These figures indicate the state is now spending less than 2 cents per annum on each individual consumer of certified, grade-A raw and pasteurized milk to protect him from milk-borne diseases spread by carriers who may be detected by laboratory examinations. The remainder of the population, 42.2 per cent, do not as yet have the benefit of these services until after an outbreak of milk-borne disease has occurred and been recognized as such. That the ungraded raw milk they drink is a public health hazard

is demonstrated by a number of outbreaks of milk-borne disease, traceable to it, occurring during the 77 months covered by this study. It is true that the producers of this type of milk include small farmers who milk only 1 or a few cows each day. The feasibility of extending milk-handler control work to every 1-cow dairy might be questioned but it could be extended to all dairies where the volume of milk sold would be sufficient to constitute a public health hazard without increasing the cost per examination over that for handlers of the grades of milk now examined.

On the basis of the above figures, the expenditure for these milk-handler tests for 1933 will be less than 7 cents for each 1,000 quarts of milk produced in the entire state. The average amount expended per 1,000 quarts of certified, grade-A raw and pasteurized milk will be less than 12 cents.

TABLE IV
ESTIMATED COST OF MILK HANDLER EXAMINATIONS PER ANNUM AND ESTIMATED
COST OF DETECTION OF EACH CARRIER

Year	Number of Examinations	Estimated Unit Cost per Examination	Estimated Total Cost	Number of Carriers Detected	Estimated Unit Cost per Carrier
1927 (Apr.-Dec.)	7,733	\$0.51	\$3,944	3	\$1,315
1928	7,880	0.495	3,901	7	557
1929	7,193	0.535	3,848	1	3,848
1930	12,603	0.57	7,184	7	1,026
1931	18,821	0.555	10,446	27	387
1932	21,291	0.51	10,858	9	1,206
1933 (Jan.-Aug.)	15,736	0.50	7,868	17	463
Recapitulation (77 months)	91,257	\$0.527	\$48,048	71	\$ 677

TABLE V

COMPARATIVE ANNUAL EXPENDITURES PER HANDLER AND PER 1,000 QUARTS OF VARIOUS GRADES OF MILK BASED ON 1933 ESTIMATES

Grade of Milk	Number of Handlers	Frequency of Examination per Annum	Cost of all Laboratory Tests at each Examination at Unit Cost of \$0.50	Total Cost per Annum	Cost per Handler per Annum	Thousands of Quarts of Milk Produced Annually	Cost of Laboratory Tests for each 1,000 Quarts in Cents	Multiple of Cost per 1,000 Quarts of Pasteurized Milk
Certified	116	12	\$5.625*	\$7,830	\$67.50	3,370.4	232.	40
Grade-A Raw	301	2	7.00	4,214	14.00	8,121.2	51.	10
Pasteurized	1,115	1	7.00	7,805	7.00	151,475.2	5.2	1

* This figure takes into consideration the fact that Widal tests are requested by the physician on handlers of certified milk on an average of only once each year.

FREQUENCY OF MILK-HANDLER EXAMINATIONS

At present handlers of certified milk in Connecticut are examined once a month; handlers of grade-A raw milk once every 6 months; handlers of pasteurized milk once a year. As a consequence of the outbreak of septic sore throat spread by certified milk in 1926, consumers of this grade of milk were at once given the benefit of rather intensive milk-handler examinations. It has been possible to extend this service to include handlers of grade-A raw and of pasteurized milk on a less extensive scale but efforts of this department to secure the necessary laboratory personnel and budget that would permit the same frequency of examinations have been unavailing to date. Under present requirements the frequency of examinations of handlers of these last mentioned grades of milk is not in proportion to the frequency of examination for handlers of certified milk which more nearly approaches the ideal from the viewpoint of the public health official. This becomes increasingly evident when the situation is analyzed as in Table

V on the basis of the 1933 statistics for comparative numbers of handlers and amounts of milk produced. It is indicated in Table V that laboratory examinations on each handler of certified milk are costing annually approximately 5 times the amount expended on each handler of grade-A raw milk and approximately 10 times that expended on each handler of pasteurized milk. Furthermore, it is shown that the amount of money expended for these examinations on handlers of certified milk is 4 times as great for each 1,000 quarts of milk produced as on handlers of grade-A raw and 40 times as great as on handlers of pasteurized milk.

Although ideal from the standpoint of disease prevention to increase the frequency of examination of handlers of grade-A raw and pasteurized milk to compare with that for handlers of certified milk this seems impossible at present with the funds obtainable. Furthermore, we believe that any expansion of the work of the laboratory in milk-handler control should include periodic examinations of as many of the handlers of the ungraded raw milk

consumed by 42.2 per cent of the population of Connecticut as is feasible.

VALUE OF MILK-HANDLER CONTROL WORK

No outbreaks of milk-borne diseases have occurred among users of certified, grade-A raw or pasteurized milk in Connecticut since the inception of milk-handler control work. How much of this freedom from milk-borne disease has been due to detection of carriers by the laboratory cannot be truly estimated.

The importance of milk-borne disease in Connecticut can best be demonstrated by recounting parallel experiences with outbreaks,^{14, 15, 16, 17} due to carriers or cases working in dairies or on farms producing the ungraded raw milk not covered by milk-handler regulations. During the 77 months covered by this study there have been 7 such outbreaks which have been thoroughly investigated by the Bureau of Preventable Diseases of the State Department of Health—4 of scarlet fever and septic sore throat, 2 of typhoid fever and 1 of paratyphoid fever. The outbreaks of scarlet fever and septic sore throat have involved 328 cases with 5 deaths; those of typhoid and paratyphoid fevers, 55 cases with 2 deaths.

Assuming 3 weeks to be the minimum time an individual is incapacitated due to illness and quarantine by an attack of scarlet fever or septic sore throat and 8 weeks as the average for typhoid or paratyphoid fevers, this gives the astonishing total of 1,424 weeks, or 27 years $4\frac{1}{2}$ months, during which persons have been forced to remain away from their regular duties or from school because of preventable diseases spread by milk infected by carriers. We may summarize the economic loss from the 7 milk-borne outbreaks as the 1,424 weeks of enforced idleness, the cost of medical care for the 383 patients and the loss of 7 lives, plus the cost of 7

funerals. If this economic loss, difficult to state in dollars and cents, may result from the presence of 7 carriers in 7 dairies, the expenditure of \$48,000 in 77 months which located more than 10 times that many carriers needs no other justification.

DISCUSSION

We have devoted the greater portion of this study to analysis of our results on milk-handler specimens because we believe our data on other food handlers have not yet reached the proportions necessary for satisfactory evaluation of results. However, we call attention that we have located 16 carriers of typhoid and paratyphoid organisms among food handlers in the 32 months since January 1, 1931. Five have been detected by periodic examinations of milk handlers; 11 have been detected among other food handlers after epidemiological investigation. We point with a certain amount of pride to the fact that 5 out of 16, about one-third, have been detected before causing any known damage. We consider this a strong answer to the argument that laboratory examinations of food handlers are of little value in the absence of epidemiological investigation.

We have shown that the estimated amount expended for the detection of a single carrier varies from year to year (Table III)—in our experience from a minimum of \$387 in 1931 when 27 carriers were found to a maximum of \$3,848 in 1929 when only 1 carrier was detected. Reduced to simplest terms, this demonstrates that it may cost at least 10 times more in 1 year to locate a carrier than in another. This serves to show the impracticability of attempting to evaluate work of this type in terms of 1 year or of 10,000 or 20,000 examinations.

The conclusions that may be drawn from this study are applicable to any region to the extent that the existing

conditions are comparable to those in Connecticut. The primary condition is that the laboratory doing the food-handler control work must be doing a sufficiently large volume of work so that the unit cost per examination will be small.

SUMMARY AND CONCLUSIONS

1. Connecticut requirements for periodic laboratory examinations of food-handler specimens and the laboratory methods involved are briefly described.

2. Statistics on laboratory examinations of milk-handler specimens over a period of 77 months and on other food-handler specimens covering a period of 32 months are presented in a manner to show the total number of examinations, the number of positive examinations and the number of individuals represented by the positive examinations for each year and type of examination.

3. Statistics on 91,257 laboratory examinations of milk-handler specimens are subjected to an analysis showing estimates of the annual costs based on a unit cost per examination varying slightly from year to year. Significant figures brought forth are: total cost of the 91,257 examinations in 77 months, \$48,048; average cost of detecting each of the 71 carriers found, \$677; per capita cost for 1932, less than 2/3 cent; cost per consumer per annum less than 2 cents in 1933; cost per 1,000 quarts of milk (all grades), less than 7 cents in 1933. The cost per carrier per annum was found to vary from year to year, from a minimum of \$387 to a maximum of \$3,848.

4. A correlation of results obtained with the funds expended establishes the general utility and importance of routine laboratory examinations made periodically on important groups of food handlers in a central laboratory doing a large volume of work.

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Differential Reactions in the Colon Group of Bacteria*

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THE brief discussion which follows will be restricted to a consideration of: (a) technics for the detection of certain metabolic end-products (acetyl-methyl-carbinol and hydrogen sulphide), which are useful for differentiation, and (b) some observations on enrichment culture media which tend to favor the growth of the citrate negative coli strains (*Escherichia*) and to restrict or exclude the citrate positive types (*Aerobacter* and *Citrobacter*).

long period recommended for incubation of cultures and the time required for the development of the characteristic eosin-like coloration (after the addition of the alkali).

A study was therefore undertaken to determine what would constitute a particularly suitable medium and test reagent to accelerate the determination in question. A comparison was made of the specially prepared dehydrated M.R.-V.P. medium (recommended by

TABLE I
COMPARISON OF DIFCO M.R.-V.P. AND CLARK AND LUBS MEDIA
(INFLUENCE OF MEDIUM ON V.-P. TEST)

Reaction with 10 per cent KOH	Difco M.R.-V.P. Medium			Clark and Lubs Medium 30° C. 5 days
	37° C.		30° C.	
	24 hrs.	48 hrs.	5 days	
+	172	180	167	166
s1+	6	1	9	12
-	3	0	5	3

181 strains tested

I. DETECTION OF ACETYL-METHYL-CARBINOL

One of the objections frequently raised against the employment of the Voges-Proskauer reaction is the rather

Digestive Ferments Company) with the original Clark and Lubs medium. Observations on 181 strains which were known to be positive for acetyl-methyl-carbinol production are summarized in Table I. It is evident that with a long period of incubation (5 days), there is no significant difference between the results obtained with the two media but

* Read before the Laboratory Section of the American Public Health Association at the Sixty-second Annual Meeting in Indianapolis, Ind., October 12, 1933.

that a shorter period of incubation (48 hours at 37° C.) as recommended for the Difco M.R.-V.P. medium, gave a distinctly larger number of positive tests.

From evidence available it is felt that the decrease in intensity and number of positive reactions when longer incubation periods are employed is due to the destruction or disappearance of acetyl-methyl-carbinol as has been reported

TABLE II
COMPARISON OF CREATINE-ALKALI
SOLUTION AND 10 PER CENT KOH
AS TEST REAGENTS FOR V.-P. TEST

Time after addition of test reagent	0.3% Creatine in 40% KOH	10% KOH
	% Positive tests	
1 hr.	75.3	5.1
2 hrs.	96.1	24.9
4 hrs.	100.0	76.3
12 hrs.	100.0	99.4

by Paine. The long incubation periods so frequently recommended and employed are not desirable.

In the foregoing observation the test consisted of adding 10 per cent KOH to an equal volume of test culture as

originally employed by Voges and Proskauer. Recently O'Meara suggested the use of creatine powder with 40 per cent KOH as the test reagent. Table II shows a comparison of the speed of development of the pink coloration characteristic of the V.-P. test when employing 10 per cent KOH and a modified O'Meara reagent (0.3 per cent creatine in 40 per cent KOH). It is evident that the creatine-alkali solution appreciably reduced the time necessary for a positive test, 96.1 per cent of 181 strains tested showing a positive reaction within 2 hours after addition of the reagent.

The test as originally suggested by O'Meara stipulated the addition of about 25 mg. of creatine powder to 5 c.c. test cultures followed by the addition of 5 c.c. 40 per cent KOH. This procedure was found to be cumbersome. It was therefore desired to ascertain whether the reagents might not be employed as a solution. In the results reported in Table II such a solution was used and found to give satisfactory results. The question arose as to the stability of such a mixture. The effects of temperature and period of storage of the creatine-alkali mixture on the rate

TABLE III

EFFECT OF TEMPERATURE AND PERIOD OF STORAGE OF CREATINE-ALKALI SOLUTION
ON V.-P. REACTION (30 MIN. READING)

Period of Storage	Temperature of Storage		
	6°-10° C.	22°-25° C.	53°-55° C.
1 day	+++	+++	+++
2 days	+++	+++	+++
3 days	+++	+++	++
4 days	+++	+++	-
7 days	+++	+++	-
14 days	+++	++	-
28 days	+++	+	-
42 days	++	sl+	-
56 days	sl+	-	-

TABLE IV
VOGES-PROSKAUER REACTION ON 202 AEROBACTER
STRAINS EMPLOYING 6-7 HOURS CULTURES AT 30° C.

Time Elapsed After		Positive Reactions	
Addition of Test Reagent*	Inoculation	Number	Per Cent
1 Hour	7-8 Hours	157	77.8
2 Hours	8-9 Hours	195	96.5
4 Hours	10-11 Hours	202	100

* Test reagent consisted of 0.3% creatine in 40% KOH.

of development of the V.-P. reaction are shown in Table III.

In the work reported, 24 hour cultures were employed and the reaction was taken 30 minutes after the addition of the test reagent. Preliminary studies indicated that this was ample time when employing 24 hour cultures. It is evident from Table III that the creatine-

alkali solution may be kept for 4 to 6 weeks if stored in a cool icebox and not over 2 weeks at room temperature (22° to 25° C.), whereas at high temperatures (53°-55° C.) it deteriorates very rapidly.

In order to ascertain whether the incubation period for detection of the production of acetyl-methyl-carbinol

TABLE V
DIFFERENTIAL REACTIONS IN THE COLON GROUP

Genus	<i>Escherichia</i>	<i>Aerobacter</i>		<i>Citrobacter</i>
		cloacae	aerogenes	
No. of Strains	155	80	123	43
Character	Per Cent Positive Reactions			
Growth in Citric Acid	0	100	100	100
V.P.	0	100	100	0
M.R.	100	0	0	100
H ₂ S	1	0	0	100
Indol	97	0	60	0
Glycerol	47	0	100	100
Aesculin	73	34	100	0
Salicin	71	74	100	0
Starch	0	1	99	0

TABLE VI
EFFECT OF TEMPERATURE ON GAS PRODUCTION

Genus	Escherichia 31 strains	Citrobacter 54 strains	Aerobacter 181 strains
Culture Medium	Inoculated at room temperature and placed in incubator at 45-46° C. (Temperature of medium rose to 43-44° C.)		
Eijkman Glucose Broth	100*	77.8	4.4
Laetose Broth	100	0.0	3.9
Brilliant Green Bile (2%)	90.6	20.4	2.8
	Medium warmed to 45-46° C. before inoculation and maintained at 45.5-46° C.		
Eijkman Glucose Broth	64.5	0.0	0.0
Laetose Broth	38.7	0.0	0.0
Brilliant Green Bile (2%)	45.2	0.0	0.0

* Figures indicate per cent positive for gas production after 48 hours.

could be appreciably shortened, a large number of strains (202) were tested in the following manner: A small loopful (1½ mm. diam.) of a young agar slant culture was introduced into about 3 c.c. of Difco M.R.-V.P. medium, the mixture incubated at 30° C. for 6 to 7 hours, after which the creatine-alkali test reagent was added. Readings were then taken after 1, 2, and 4 hours. It will be noted that in every instance positive reactions were obtained within 4 hours after the addition of the test reagent or a total period of 10 to 11 hours from the time of inoculation.

It is possible to shorten the time required for the determination of the Voges-Proskauer reaction from 2 to 5 days as recommended by *Standard Methods of Water Analysis* (A.P.H.A., 1925) to 7 to 11 hours by employing the technic herein proposed.

II. MEDIUM FOR THE DETECTION OF HYDROGEN SULPHIDE PRODUCTION

In the course of a study of a large number (401) of coli-like bacteria from eggs it was noticed that those which produced browning in the standard lead acetate agar seemed to constitute a rather homogenous group. They resembled the genus *Aerobacter* in that they grew vigorously in citric acid as a sole source of carbon, but differed from this genus in that they were negative with respect to the V.-P. reaction and positive with the methyl red test, thereby resembling the genus *Escherichia*. Other differential characteristics of this group of bacteria for which the generic term *Citrobacter* has been suggested, are summarized in Table V.

The H₂S reactions in the standard lead acetate medium were not clear-cut and the apparent significance of this

differential test for the group under consideration led to a study of media for accentuating the test. The following medium was found to be particularly suitable for H_2S production and detection:

Proteose peptone (Difco)	20 g.
K_2HPO_4 (anhydrous)	1 g.
Bacto agar	15 g.
Ferric citrate	0.5 g.
Distilled water	1,000 c.c.

Dissolve by boiling, tube and sterilize at 15 lb. for 15 minutes. Inoculation is made preferably from 24 hour broth cultures by stabbing into the middle of the solidified medium and also down the side of the medium in contact with the inner surface of the tube.

III. TEMPERATURE OF INCUBATION AS A DIFFERENTIAL TEST

The use of high temperatures for the isolation of members of the colon-group was first stressed by Eijkman who recommended glucose broth at $46^\circ C$. The importance of stipulating whether the temperature refers to the incubator or the medium proper has been frequently stressed* and this is evident also from Table VI.

It is evident that with an incubator temperature of $45-46^\circ C$. (temperature of the medium $43-44^\circ C$.) the *Escherichia* strains grew well in the Eijkman medium and Standard Lactose Broth, but some strains were inhibited in brilliant green bile. The *Aerobacter* strains were markedly inhibited in all of the media. It is particularly interesting to note that whereas 77.8 per cent of the *Citrobacter* strains showed gas in the Eijkman medium, none were positive in lactose broth.

With the temperature of the medium raised before inoculation and maintained at $45.5-46^\circ C$. gas was not produced by any of the *Aerobacter* or

Citrobacter cultures, although growth was frequently evident; but the *Escherichia* strains were also markedly inhibited as respects gas production at that high temperature.

IV. A BORIC ACID MEDIUM FOR GROWTH OF ESCHERICHIA AND INHIBITION OF AEROBACTER AND CITROBACTER STRAINS

Numerous media have been reported for growth of *Aerobacter* and closely related strains with the exclusion of the members of the genus *Escherichia*, but a medium which exhibits the reverse phenomenon would be very useful. In 1921 Levine suggested that boric acid seemed to exert a greater inhibitory action on aerogenes than upon coli strains. The following medium has been tested with a large number of strains with the results indicated in Table VII, and seems to be very promising. The cultures of the genus *Aerobacter* were very markedly inhibited with only 6.1 per cent showing gas in 48 hours with 0.325 per cent boric acid. The *Citrobacter* strains were all negative whereas of the 150 *Escherichia* strains tested, 97.3 per cent produced gas.

Composition of medium:

Proteose peptone (Difco) . .	10 g.
Lactose	5 g.
K_2HPO_4 (anhydrous)	3 g.
Andrade indicator	10 c.c.
Boric acid	3.0-3.25 g.
H_2O (distilled)	1,000 c.c.
Sterilize at 15 lb. for 15 minutes.	

SUMMARY

A technic is described for detecting the production of acetyl-methylcarbinol (V.-P. reaction) in 6 hour cultures. The test reagent consisted of 0.3 per cent creatine dissolved in 40 per cent KOH. This creatine-KOH solution was employed satisfactorily for 3 weeks when stored at room temperature and for 6 weeks when stored at icebox temperature.

* Private communication Brown and Skinner.

TABLE VII
EFFECT OF BORIC ACID ON GROWTH OF COLON-GROUP AT 37° C.

Period of Incubation	24 hrs.		48 hrs.	
Concentration of Boric Acid	0.30%	0.325%	0.30%	0.325%
Cultures observed	Per cent showing gas			
<i>Escherichia</i> (150 strains)	92.7	87.3	97.3	97.3
<i>Aerobacter</i> (181 strains)	1.7	0.6	13.8	6.1
<i>Citrobacter</i> (57 strains)	0.0	0.0	0.7	0.0

A medium containing proteose peptone (Difco) and ferric citrate, as an indicator, was found to be particularly satisfactory for the detection of H_2S production, and this phenomenon served to differentiate the strains which were V.P. negative, methyl red positive and citrate positive (genus *Citrobacter*), from the other members of the colon-aerogenes group.

With an air temperature of 45-46° C., employing the standard lactose broth medium, all (31) strains of *Escherichia* observed produced gas, whereas all (54) *Citrobacter* strains failed to produce gas and of 181 cultures of *Aerobacter*, only 3.9 per cent produced gas. With a temperature of 45.5-46° C., in the medium proper, marked inhibition of the genus *Escherichia* was noted (only 38.7 per cent producing gas), and in no instance was gas produced by any of the *Citrobacter* (54) or *Aerobacter* (181) strains examined.

A medium containing boric acid is described which may be useful for detection of the genus *Escherichia* and to exclude or inhibit growth of the genera *Citrobacter* and *Aerobacter*. With this medium 97.3 per cent of 150 strains of

Escherichia showed gas whereas only 6 per cent of 181 strains of the genus *Aerobacter* produced gas in 48 hours at 37° C. Gas was not produced by any of 57 strains of the genus *Citrobacter* tested.

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Relative Values in Tuberculosis Case Finding

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“**N**USQUAM est, qui ubique est” (He who is everywhere is nowhere) has its application to the predominant thought in the minds of many social workers and others who are interested in tuberculosis. The attractiveness of doing something new, the human appeal of children to the masses, has diverted altogether too many workers in tuberculosis from case finding work in the fertile field of cases, contacts, and doubtful cases, to the less productive and the more expensive method of case finding among school children. Unless the home and contacts of every reactor are studied epidemiologically, little, if anything, is really achieved. The importance of concentrating efforts upon cases, contacts, and doubtful cases of tuberculosis cannot be overemphasized.

The valuable work in the field of childhood tuberculosis performed by several research groups should be continued. However, those in charge of public tuberculosis programs, particularly where public funds are used, should take stock of the results obtained and center their efforts in a manner conducive to the best possible results. What percentage of public funds may be used for research is a question; but no one will deny that those charged by the people with a special piece of work should use known and proven methods, diverging into untried, unproved and

less productive paths only if there is time and money left.

The proponents of the tuberculin testing of school children seem to forget, first, that for all practical purposes there is a difference between infection and disease, or if they are fully cognizant of this difference, they neglect to emphasize it to the nurses, social workers, and parents concerned with the children tested; and second, that among grade school children tuberculosis is usually a benign disease. In upstate New York only 3.2 per cent of all tuberculosis deaths occur in the age group from 2 to 14 years. Lack of appreciation of these facts creates confusion and no little apprehension in the minds of parents and others. Not infrequently we hear it said that a child who reacts to tuberculin is a potential consumptive. In the absence of evidence of manifest tuberculosis, or contact with an open case, are we not stretching our imaginations in saying that such a child is potentially tuberculous from a disease standpoint? Are we not tending in another manner to lead parents and children to become pathological minded?

In summarizing the conclusions of many workers, Korns,¹ Slater,² Chadwick,³ Hetherington and McPhedran,⁴ Bridge and Stokes,⁵ Ryan,⁶ Hart,⁷ and Bernard,⁸ we find practically a unanimity of opinion regarding the in-

fluence of age, contact, and population density upon the incidence of tuberculosis. As children become more mobile the opportunity for accidental infection by casual, direct, or indirect contact increases. The more concentrated the population, and the higher the death rate, the greater the incidence of infection. Many workers have shown that tuberculosis is found from 5 to 9 times more frequently among contacts than in the population as a whole.

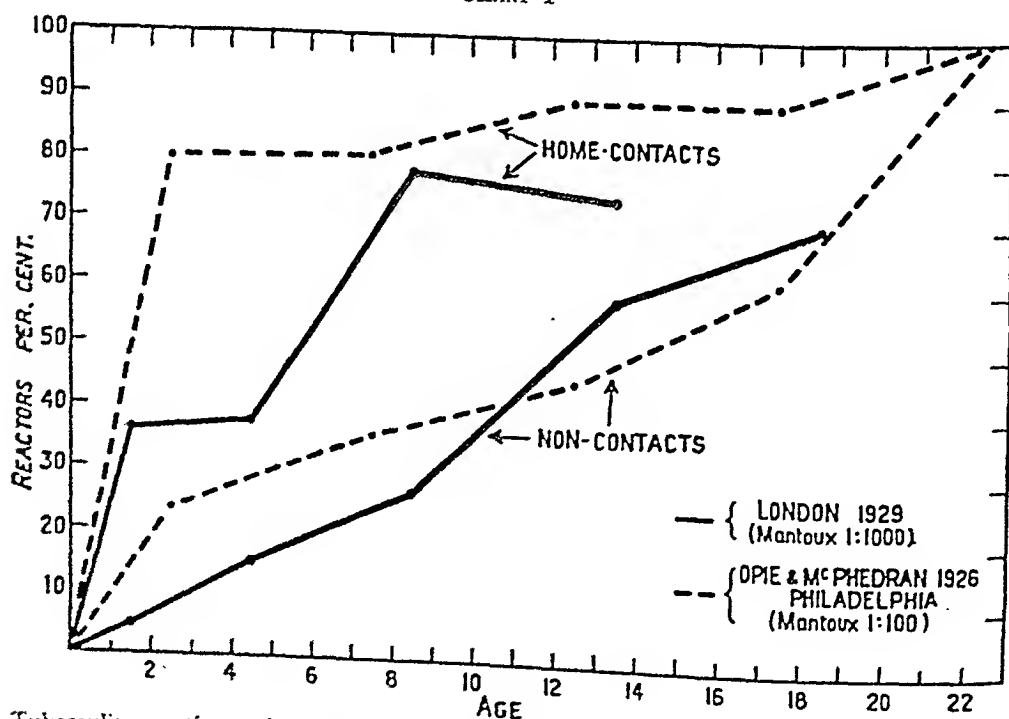
In our study⁹ of 537 freshman students of New York State normal schools, ages 16 to 19, 33.4 per cent of the total group were positive to 0.1 mg. of tuberculin. A study of the residence of the group tested up to the time they entered school, on the basis of population, showed that of those re-

siding in communities of less than 2,500, 28 per cent were positive, in communities between 2,500 and 10,000, 36.5 per cent were positive, and in those of 10,000 and over, 42 per cent were positive. Only 1 case of adult type tuberculosis was found in the entire group.

Chart I, taken from the Medical Research Council's *Special Report, Series No. 164*, by P. D'Arcy Hart, shows the percentage of reactors among non-contacts and contacts both in London and Philadelphia.

It will be seen from this chart that (a) the curve for home contacts runs above that for non-contacts and (b) the shapes of the two curves differ. This difference in shape may have some epidemiological interest. It suggests that the tuberculinization of home con-

CHART I



Tuberculin reactions of non-contacts and of home-contacts of pulmonary tuberculosis (From Schlesinger & Hart, 1930)

U.S.A.: Philadelphia. Opie & McPhedran (1926): home-contacts of pulmonary tuberculosis, hospital class (? includes a few cases of clinical tuberculosis). Non-contacts of tuberculosis, hospital class.

England: London, 1929. Home-contacts of pulmonary tuberculosis, hospital class, all clinically non-tuberculous.

Non-contacts of tuberculosis, hospital class, all clinically non-tuberculous.

tacts has its maximum rate in infancy and early childhood, whereas the tuberculization of non-contacts occurs at approximately the same rate from birth to manhood.

Observers in other communities have published comparable figures regarding the incidence of infection. Bridge and Stokes report that they found 2.5 per cent of rural school children with some pathology by X-ray against 12.1 per cent of the children who were examined because of contact.

Chadwick¹⁰ says, "Our problem is to prevent infection. No one will deny the manifold benefits of complete freedom of contact with tubercle bacilli." Hetherington¹¹ says that "since 80 per cent of the high school children of Philadelphia have been exposed and become allergic, it is impracticable to avoid all contact with the tubercle bacillus."

It may be possible in a strictly rural community to avoid infection, especially in the pre-adult ages, but when it is found that the incidence of infection among the general population in adult life approaches the amount found among contacts in children is it not more practical again to emphasize the importance of contact and endeavor to prevent continued, or massive infection? To be sure, this is the goal of all tuberculosis workers, but a review of the activities of many of them results in the conclusion that they are making many detours in locating the goal as well as in attempting to arrive there.

In the light of our present knowledge the important fact in the development of tuberculosis is the intimacy of contact. The greater the opportunity for repeated and massive infection the greater the opportunity for breakdown. If this be so, should we not strive to minimize the chance for such a degree of infection by finding and segregating the case and treating it with the hope of making it sputum negative?

Unquestionably, the work in the schools has made many more people tuberculosis conscious, and considerable improvement in the technic of public control may result from their increased interest, but prevention still remains the fundamental principle of tuberculosis control.

The word "prevention" naturally stimulates thought regarding the *modus operandi* by which an effective program may be obtained. For years case finding has been the alpha of tuberculosis control. When we speak of case finding today, the practice of testing wholesale groups, especially groups of school children, comes to the foreground in the minds of many. It is not with any lack of appreciation of the value of this research work that emphasis is laid on the need of more intensive work among cases, contacts, and suspects. On the contrary, there is much to learn regarding the genesis of tuberculosis before we can afford to be dogmatic in our statements about it. Further studies should be made, and to obtain the most effective results they should be conducted by groups equipped to make them in a thoroughly scientific manner. In a disease having the characteristics of tuberculosis long periods of observation and study are necessary before an answer can be found regarding its genesis.

The support of the practising physicians in any tuberculosis service is paramount. They should assume a prominent place in the prospectus of every program. They see most cases before there is any suspicion of the presence of tuberculosis, and when, by experience, they learn that both they and their patients are benefitted, they become active participants in the program of tuberculosis control.

There appears to be no proof available that any method of approach to case finding in tuberculosis can produce results comparable in cost and energy

expended with that concerned with the combination of morbidity and mortality statistics and the coöperation of the practising physicians. For more than 14 years the New York State Department of Health has conducted a consultation clinic service in counties having no special tuberculosis service. The average resident death rate for these counties over the past 5 years has been 44.7 per 100,000 population. Practically all the physicians in the communities in which these clinics are held refer contacts of dead and known cases, as well as patients who may show some suspicious symptoms or signs of diseases of the lungs. The extent of the coöperation of these physicians may be interpreted by the number of their patients attending the clinics who have the benefits of public health nursing follow-up in their homes. Less than 6 per cent do not have the benefits of this service because of physicians' refusals.¹² Comparing our case finding figures with some of the largest childhood programs, it is found that 8 or more cases of adult type tuberculosis are discovered for every 1 in those programs. Of every 20 new patients examined at our clinics 1 new case of adult type tuberculosis is discovered. Of all the persons examined, 1 new case of adult type tuberculosis is discovered in every 41. Moreover, we find 12 times more clinical tuberculosis among adolescents and adults than among the children.

In conclusion, the X-raying of the entire population once or twice a year might result in the discovery of every case of tuberculosis. This being impractical, it is urged that those phy-

sicians charged with the responsibility of tuberculosis control intensify their efforts among cases, contacts, and patients referred from private practice by physicians. In every community these groups constitute the major part of the tuberculosis problem. When the work in these groups is thoroughly accomplished, then other groups, school children, and industrial groups may profitably be studied. Incidentally, if the work is thoroughly performed in the fertile field above mentioned, a large number of the cases which may be discovered by the other methods will already have been disclosed by this less expensive and more profitable service.

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Development of Public Health Administration in the Province of Quebec*

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THIS is the second time during 2 years that I am asked to show you something of the development of public health in the Province of Quebec. At the Montreal meeting, I spoke on rural sanitation from a Provincial standpoint and, after a brief history of what public health administration was in the Province during the years prior to 1926, I tried to demonstrate how great progress had been made since then through the institution of the County Health Units System.

Let me say, in order to complete the statement which I then made, that the Province of Quebec has now 28 Health Units covering 36 counties with one more in prospect, to be in operation in a few weeks; that more than 900,000 people are now protected by that system, out of a possibility of 1,700,000, constituting our rural and semi-rural population; that, thanks to this logical and scientific organization, our general mortality rate fell from 13.5 in 1926 to 11.4 in 1932, and our infant mortality rate from 142.0 per 1,000 living births to 94.2 in the whole Province and 85.8 in the Health Units.

But, it is in the realm of the fatalities caused by infectious diseases that this decrease has been particularly remarkable. In 1926, the whole

Province lost 4,144 individuals by contagious infections, a rate of 158.3 per 100,000; and in the counties, which were organized later on, 1,705, a rate of 204.1. In 1932, those deaths numbered 2,363, a rate of 80.8 all over the Province, and in the units the number fell to 690, a rate of 76.5, marking a decrease of 48.9 per cent for the whole Province of Quebec and of 62.5 per cent for the counties provided with health units.

There is nothing against the facts. The demonstration is now done and, in my mind, it is proved beyond all doubt that in a country where the authorities are willing to raise up the standard of public health, nothing is comparable to the system which we copied in part from yours in the United States, and which was recommended to us by the Rockefeller Foundation, taking into account the modifications necessitated by our particular conditions.

One of these particularities, which I mentioned at the Montreal meeting, was the unity of direction put in the hands of the central office, the complete jurisdiction of this body all over the local units, and the adoption of the principle that the health organization in a county and the authority over it must not be left in the hands of local individuals—as well disposed as they may be—subject to numerous changes of opinion in the mind of the municipal authorities.

* Read before the Health Officers Section of the American Public Health Association at the Sixty-second Annual Meeting in Indianapolis, Ind., October 12, 1933.

Up to the last winter, the fate of every county health unit in our province, as the thing happens to be in every country where this system exists, I think, was left in the hands of local authorities appropriating a certain sum of money toward their maintenance and receiving the help of the state. The result was that during a period of economic depression like the one we are now passing through, it was to be feared that our county councils would be led, due to the circumstances, to neglect the public health viewpoint and to let a system toward which so many efforts were consecrated, fall to pieces and the situation be turned to what it was many years ago.

We, of the Provincial Health Service, estimated that that would have been a disaster, and we tried to bring our Ministers to the idea of making permanent and compulsory all the existing units and of giving to the Cabinet, on the recommendation of the Department, the power of establishing new ones in the remaining counties, at the authorities' convenience.

We were fortunate enough to succeed in our efforts, and the law assented to on April 13, 1933, adopted by the Legislature 2 weeks previously, was brought into the Statutes of the Province of Quebec, saving the existence of a system to which our population owes so much.

Considering the difficulties with which all our municipalities are suffering at present, the legislators decided, in order to alleviate the burden of taxation for public health, to impose as a contributory share by each municipal county corporation provided with a health unit, a small sum calculated on the basis of $1\frac{1}{2}$ cents per 100 dollars of the amount of the taxable valuation, appearing in the valuation rôle in force in each of the municipalities, and 2 cents in the independent cities and towns situated in the counties and hav-

ing a population of 4,000 people or more, but less than 20,000. The balance of the budget of each county health unit is to be provided for by the Provincial Government.

The same law repeats the disposition of the old one and puts the county health units under the direction and control of the Director of the Provincial Bureau of Health.

This legislation which we, at home, consider far advanced, brought an element of security to the work toward which so many efforts have been concentrated during the last few years.

It would be useless to have a good law in the Statute Book and to neglect the important part of the continuity of the work which was inaugurated at the beginning.

Starting from the principle that an efficient public health work rests on the base of an adequate education of the people, and that education must be impressed upon them in the early years of life, we intensified, all over the territory covered by our organization, the babies' clinics, which from the day they were inaugurated, met with so much success in all our counties.

As you know, infantile mortality was, with tuberculosis, the main scourge affecting our population. A mortality rate of 142.0 per 1,000 living births in 1926 was a thing which we were not proud of, and we may say that the decrease to 94.2 in 1932 for the whole Province, and to 85.8 in the units, was due to the net-work of clinics spread over the territory provided with our organization.

These clinics are held in every municipality of the counties by our health officers, assisted by a public health nurse. The attendance of babies, which was for the fiscal year 1932-1933, 83,083, has increased to 3,500 per week, which signifies that during the present fiscal year, 182,000 babies will be seen by our officers.

In a number of these clinics, pre-school children attend also, and we instructed every health officer at their last general meeting, to give special attention to this attendance of preschool children, keeping in view the point that if we succeed in improving the health of the young generation we will secure for the future a healthy population.

Before leaving the question of child protection, I wish to say a word of our generalized campaign of immunization against diphtheria in all our units.

We took as granted that immunization against diphtheria is a matter of prevention and not of treatment, and so must be left in our hands. We have all due consideration for the privileges of the medical practitioner and we understand perfectly that he is entitled to the right of himself practising immunization against diphtheria among his clients when they ask him to do so. But, in the presence of a situation like the one which happened in 1927, when the Province of Quebec lost 467 children, victims of diphtheria, we considered that it would have been a national crime not to take the matter in hand and not to offer the population the advantage of being protected against that dreadful disease by all means at our disposal. We decided to institute free immunization clinics in all our county health units, offering immunization by toxoid, to the parents willing to have their children protected.

So far, the proportion of immunized children in the county health units, speaking generally, nearly attains 75 per cent; in some counties this reached 100 per cent, with the result that on July 1, 1933, 150,137 children were safe from the disease and the mortality rate from diphtheria was reduced to 6.5 per 100,000 in the Province.

I would like to say a few words of the System of Travelling Tuberculosis Clinics which we inaugurated and de-

veloped in the last few years in our counties.

Our health units, for the purpose of tuberculosis control, are divided into 5 districts each in charge of a full-time tuberculosis specialist, travelling from one municipality to another, provided with a portable X-ray apparatus and who examines the chest of every person willing to be examined, on a certain day of the week announced the previous Sunday by the parish priest from the pulpit.

During the last fiscal year approximately 25,000 were so examined by these diagnosticians, brought or sent to the clinics by their family doctor, the nurses, and the school commissions. Numbers of them were perfectly ignorant of the state of their lungs, and the good advice given in the following week by the district nurse had the effect of teaching them the way of protecting themselves and their surroundings.

We, in the Province of Quebec, are short of a considerable number of beds for the tuberculous; as a fact, we should have 1,300 more of them than we have at present; this time of financial difficulties prevents the public authorities from establishing new sanatoria and hospital sanatoria, but in the meantime the educational campaign conducted by our men constitutes an element of protection and improvement of this situation. I consider that it is a good way of eradicating this scourge from our population.

We also established, 4 years ago in the Province of Quebec, what is called in France "L'Oeuvre Grancher" and which, according to my information, does not exist elsewhere in America, and is destined to accomplish much good.

This protection system consists in taking from poor families in the cities, where there exists an open case of tuberculosis, the children from 2 to 13 years of age, and putting them in the

country, in farmers' families having no children or whose children have left the home.

Statistics in France demonstrate that children, if left in their families where a case of open tuberculosis exists, contract the disease in the proportion of 60 per cent and die of tuberculosis in the proportion of 40 per cent, while the percentage of mortality from tuberculosis among children so placed in the country, is less than 1 per cent.

Taking those facts into account and wishing to add another way of fighting a social evil which has done considerable harm in the past, we began at the end of 1929 that kind of social work in the District of Montreal, and a year later, in the District of Quebec and the District of Trois-Rivières.

Through the intermediary of anti-tuberculosis dispensaries in these 3 cities, the finding of cases to benefit by the system was done by special nurses, and we took from the slums, where they lived, nearly 500 children with the written consent of the parents, and placed them, paying for their board, clothing, school, and medical care, in well-to-do farmers' families in the rural counties situated in the vicinity.

If it was not for the financial difficulties of the Government, that number of 500 would have been doubled or tripled during that period of 4 years, but, unfortunately we had to restrict somewhat our activities according to the means at our disposal. However, as soon as the situation shows an improvement we will of course accelerate the movement.

An inspection tour which I made 2 months ago in the counties in which children from the City of Montreal were

placed, showed me what effects we may hope for from such a system.

1. First of all, the children's health is perfect, and we may consider them in the future safe from tuberculosis, which would have been surely their lot if they had remained in their families.

2. All those children living in good conditions and comparing their present situation with the one they were suffering with while in the cities, are anxious to remain on the farm, and I consider this somewhat as an element helping the "back-to-the-land" movement.

3. The foster parents having had no children in the past, or having seen their children leave the home, entertain toward the children so placed in their midst a real feeling of paternal love, and I saw several of them weeping at the idea of the separation from those children. Numbers of them desire to adopt them and to make them their heirs.

This is in a few words a resumé of the work of the Children's Family Placement toward the protection of children against tuberculosis. It is not the only medium of fight which we may adopt, or which we adopt—it is one of them; and I am very confident in the future results.

This is only a part of the activities relating to the progress of public health administration in the Province of Quebec for the last years. We are not so presumptuous as to think that we have found out something new, but we have tried to adapt to our situation the methods that have proved a success elsewhere, and, thanks to the help given by our Governmental authorities, and, the thing must not be forgotten, by that great philanthropic institution—The Rockefeller Foundation—we have made a few steps forward, hoping to advance further in the road of an improved and perfect public health.

Diphtheria Prevention in Chicago

The Health Officer's Problem

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IN approaching the matter of diphtheria prevention in Chicago, it was first necessary to find out just what our problem was, so we turned to the past records.

In 1929, an average year in the history of diphtheria, there were 6,012 cases and 513 deaths. For the 10-year period, 1920-1929 inclusive, there were 54,420 cases and 4,321 deaths. During those 10 years a more or less continuous effort was made to get the school children immunized against this disease, but the morbidity and mortality did not appreciably decrease. We now know that procedure did not materially reduce diphtheria, because about 60 per cent of the deaths were occurring in children under school age, who were not being reached by our program. That this same problem holds true in the country at large, is attested by the following statement recently made by the Metropolitan Life Insurance Company:

The sad fact remains that in 1932, according to estimates, more than 5,000 children, most of them under 5 years of age, died from this disease.

We are asked:

1. How was the marked and rapid reduction of the diphtheria death rate and case rate in Chicago, brought about?

By inoculating more than 90 per cent of the preschool children with toxoid or alum toxoid.

2. How can this very low rate be permanently maintained?

By continuing to inoculate every new baby just as soon as possible after he reaches 6 months of age.

3. How can this rate be further reduced?

I do not know. The answer to that question may be forthcoming at this meeting today, just as the results obtained in Chicago were brought about through the knowledge gleaned from the reports of this section 2 years ago.

A number of you remember Godfrey's most excellent paper read at the meeting of the American Public Health Association in Montreal in 1931.¹ It started many health officers into action. He pointed out that the experiences in New York State and in Detroit, and in other cities during the preceding 9 years, seemed to indicate that if 35 per cent of the preschool children and 50 per cent of the school children were immunized against diphtheria, widespread outbreaks of this disease would not occur.

Fortified by those facts, we in Chicago set as a minimum goal, the immunization of 35 per cent of the preschool children and 50 per cent of the school children, with the most efficient immunizing agent known at that time.

Material Used—At the start of this drive, the consensus of opinion was that

¹ Read before the Health Officers Section of the American Public Health Association at the Sixty-second Annual Meeting in Indianapolis, Ind., October 9, 1933.

toxoid was superior to toxin-antitoxin. After our drive started, reports reached us that alum toxoid was even better than plain toxoid. Experiments with material kindly furnished by Dr. William H. Park, indicated that alum toxoid was the best immunizing agent to use. Three groups of children were tested, with more than 250 children in each. The first had received commercial toxin-antitoxin. Seventy-two per cent of them were found to be immune after 1 year. The second received toxoid sent by Dr. Park, and 95.9 per cent were immune within 6 months. The third group were given the same toxoid to which alum had been added, and 100 per cent became immune in 6 months. Since October, 1932, alum toxoid has been used exclusively.

To find out the most effective interval between the doses of alum toxoid, another series of experiments was undertaken. Two groups of children were tested, there being more than 250 children in each. It was found that the results were as good when 2 doses were given 1 week apart as when given 3 weeks apart; therefore, the 1-week interval was adopted.

The List of Mothers—The most difficult problem confronting the health officer is to find a way to reach all children under school age. Fortunately, there is on file in the Board of Health a list of over 300,000 mothers, representing about 425,000 living children in Chicago, born since August, 1925. This list is kept up-to-date by sending to all mothers, every month or two, copies of our child health literature. A house-to-house canvass of the entire city by nurses showed that the list was remarkably free from error, and contained the name of nearly every child of preschool and early school age. Such a file is invaluable in any public health campaign, and, was one of the most important things in making our campaign successful.

Statistical Procedures—Name stencils were run through an addressograph machine, producing a name card for each baby. The city was divided into 140 districts, the cards were distributed according to these districts, and each was assigned to a nurse. The nurses routed the cards in each district, for the purpose of making calls. In calling, the nurse's duty was to explain to the parents the need for immunization against diphtheria. She continued going into the home where an unimmunized child lived, and returned repeatedly until the child was inoculated, or until the parents definitely refused to have it protected.

As soon as the child was inoculated, a report was sent to the Board of Health, and a tab was put on the addressograph plate, by means of which a selector device kept the plate from having a card printed when it was run through again. No more visits were made in homes where the children were inoculated. We were able to keep an accurate record of all preschool children, both inoculated and not inoculated.

Early in 1933, we made maps, coloring each district according to the number of uninoculated children who remained in it. Although at that time the number of inoculated children was approximately 80 per cent, far more than enough to control diphtheria, according to Godfrey's figures, a number of cases were occurring each day, and diphtheria was far from being completely under control. When the colored map was carefully studied, it showed that the 80 per cent of children inoculated were not evenly distributed. For example, in February, 1933, one district, containing over 21,000 children, had 595 children still unprotected. Such an area within a large city is essentially a small unprotected city, in which diphtheria cases and deaths may persist, and from which the disease con-

tinues to be spread even though a large majority of the total child population is immune.

In order to obtain complete protection for the entire community no such local groups of unprotected children should be permitted to exist. Therefore, each time the cards were run through the addressograph machine, and a map made from the cards for the uninoculated children, our efforts were concentrated on those districts showing the largest number of children not yet protected.

Infant Welfare Station Centers—During the campaign, the 40 infant welfare stations, as well as the public and parochial schools, were used as diphtheria prevention stations. Our aim was to immunize every child under 6, in each station district. During the week, the nurses referred all mothers who had signed consent cards, and who were unable to afford a private physician, to the welfare stations on the following Saturday morning. If they failed to report or did not bring the children in for the second injection, the nurse made several return calls, and, as a last resort, staff members were sent to the homes to give the injections.

School Centers—Every school was used as a diphtheria prevention center. Arrangements for this were made with the Boards of Education of both the public and the parochial schools. Before a date was set for giving the injections in a given school, the principal or sister superior was consulted by the superintendent of the school, and by the field nurse, hence, the school authorities were prepared when the immunizing staff arrived. The nurses visited every home in the district where there was an uninoculated child. The mothers signing the consent cards were given an appointment to go to the school, if they could not afford a private physician. The consent cards were given to all school children under 10 years of age

to take home for signature. Each district was handled separately, and only a few of the 600 schools of the city were covered at a time.

Special Parochial School Routine—The mortality statistics for 1929 showed that 275, or over 50 per cent, of the deaths were occurring in persons of the Catholic faith, and, of these, 90 per cent were in children under 10 years of age. Therefore, a special folder containing a letter from his Eminence, Cardinal Mundelein, and a letter from the President of the Board of Health, was prepared and distributed from all of the Catholic churches, following a statement of explanation by the pastors. This work was aided materially by Dr. Louis D. Moorhead, the Cardinal's Medical Representative, and a consulting member of the Board of Health. The Sunday before the injections were to be given in the parochial schools, the pastor announced them to the congregation. He also urged the people to bring the children in for the treatments. As the congregation left the church, each person received a copy of the folder containing the letter from Cardinal Mundelein. These folders were printed in 8 languages. The splendid coöperation given us in this part of our work, contributed greatly toward the success of our program.

Before any child was inoculated, it was required that the parent give written consent; but only 1 out of every 3 children of the many thousands whose parents signed the consent cards, was actually brought in to the stations for the injections. Most of these families were so poor that they did not even have clothing or carfare to come to the station. Some others were indifferent, or claimed that they were too busy; so transportation buses were provided. This did not prove successful, as many mothers who promised to be ready at a given time, failed to keep the appointment.

Diphtheria Buses—Finally, to overcome this difficulty, buses were fitted up as traveling health centers, and these were found most effective. They were manned with doctors and nurses, and equipped with all the materials for giving toxoid injections. Before the bus started out, the nurses preceded it through the district, making appointments with the mothers to meet it at a certain corner within a few blocks of their homes. The inoculations were given then and there. If the mothers did not keep the appointments, later on, the bus went directly to the homes, to give the treatments. To help in this work, ice cream and cracker jack, donated by public spirited citizens, were distributed to the children who received the inoculation. As can well be imagined, this created a lot of enthusiasm on the part of the children. It had been difficult to get 10 or 12 children to the bus, but when it was learned that ice cream and cracker jack were being given away, the attendance jumped into the hundreds.

The Family Physician's Part—The coöperation of organized medicine is desirable in the successful conduct of any public health program; therefore, every appeal, particularly the personal contacts by nurses, was preceded by a plea that the children be taken to the family physician to receive the toxoid. Of course, when economic conditions did not permit this, free service was given. The private physician is the logical man to carry on this diphtheria prevention work and every effort should be made to encourage him to assume that responsibility.

When the nurse was told by the parent that the family physician would inoculate the child, she took down the name and address of the doctor and reported it. Then a letter was sent to the doctor telling him that the mother was going to take her child to him for the toxoid treatments. The physician

was asked to see the patient and to notify the Board of Health when the last injection was given. Approximately 15 per cent of the inoculations were given by the private physicians.

Objectors—Whenever a mother stated that she or her husband was opposed to serums or vaccines, for religious or other reasons, and a number of different nurses had called on her without success, the addressograph plate was marked with a red tab, and no further calls were made. If the parents flatly refused and gave no reason, the red tab was not at once put on. Instead, the nurse returned a number of times in an effort to sell the family on the need for the toxoid injections. It is interesting to know that of over 425,000 children on our list, of whom over 90 per cent are now inoculated, only some 14,000, or about 3 per cent, represent parents who objected.

Reactions—When hundreds of thousands of children are given toxoid injections, it is easy to see that occasional infections may occur. There is always the human equation to consider. We had some few sore arms. We found that one group of sore arms occurred in children at a certain station. The toxoid used at that station was found to be sterile. The organism was a hemolytic streptococcus. Cultures made from the throat of the doctor showed the same type of hemolytic streptococcus. From that time on we insisted on throat cultures from all of the attendants regularly engaged in inoculating groups of children.

Handling of Cases and Contacts—If we have faith that a negative Schick test, properly done, means protection against diphtheria, we should have the courage to put that faith into execution; therefore, May 1, 1933, our previous plan of giving 1,000 units of antitoxin to all children in contact with an active case of diphtheria, was discontinued in those under 10 years who had pre-

viously been given toxin-antitoxin or toxoid at least 2 weeks before the exposure. Those who had received toxoid previously were given the Schick test, and if found to be negative, were given no further treatment, but watched by the health officer from day to day. Of these diphtheria contacts who had previously been given toxin-antitoxin or toxoid, 18 were found to be Schick negative and only 1 positive. None developed diphtheria.

Diphtheria contacts under 10 years of age, who were found to be Schick positive, and who had a negative throat and nose culture, were at once given the toxoid. If over 10 years of age, 1,000 units of antitoxin were given. None of the Schick positive contacts with a negative nose and throat culture developed diphtheria. The plan contemplated that if the diphtheria contact was Schick positive, and had a positive nose and throat culture, without any clinical symptoms of diphtheria, he was to be given 1,000 units of antitoxin at once, but no diphtheria contacts with both positive Schick and positive nose and throat cultures have been found.

We adopted this plan for handling contacts: (1) since more than 90 per cent of the children had been inoculated against diphtheria, it was felt that there would be few contacts who were susceptible to the disease; (2) we believed it would prove to mothers that we had faith in the toxoid injections; (3) the plan avoided making children serum sensitive, as often happens when they are given antitoxin. Diphtheria contacts who had received antitoxin recently were not given a Schick test at this time, but 5 weeks after every recovered case of diphtheria was terminated an effort was made to have that case and all contacts who had been given antitoxin, actively immunized with toxoid.

Routine for Future Control—We have now protected the large mass of the child population under 10 years of age, and with the machinery now in operation we feel that we can easily continue to inoculate at least 90 per cent of the approximately 50,000 babies that are born every year, soon after they reach the age of 6 months. This is now being done as follows: When babies become 6 months of age, the parents are sent a bulletin which outlines the hazards of diphtheria and the need for protection against it. The nurse also makes a call at the home, urging immunization. If the immunization is not carried out, she returns again at 8 months, 10 months, 1 year, and thereafter once a month. By this method, we have succeeded in getting 40 per cent of the children inoculated by the time they are 10 months of age, 70 per cent by 12 months, 80 per cent by 14 months, 86 per cent by 16 months, and 90 per cent by 18 months. By continuing this program, we feel sure that diphtheria will become a rare, if not an extinct disease in Chicago. The effectiveness of this type of campaign is attested by the following figures: In 1929, after 10 years of the usual type of diphtheria campaign, from January 1 to October 1, there were 347 deaths. In 1933, after our specialized, intensive drive in preschool children, there were 7 deaths in a corresponding period of 9 months. In the last 16 weeks there has been only 1 death. Since July 22, 1933, there has not been a single death from diphtheria in Chicago.

CONCLUSIONS AND SUMMARY

In the diphtheria prevention campaign in Chicago, the following measures and methods were found to be important:

1. The constant use of a file containing an up-to-the-minute list of the

names and addresses of all preschool children in the city.

2. The use of alum toxoid which made it possible to produce a higher degree of immunity against diphtheria than by other immunizing agents. In 100 per cent of the cases given 2 injections of alum toxoid, at weekly intervals, negative Schick tests were obtained in 6 months, with practically no reactions.

3. Repeated personal contacts and home calls, by the public health nurse, to urge and sell the idea of immunization.

4. The traveling health centers, which took the inoculation to the child, when

that child did not come to the welfare station.

5. The campaign of the Catholic Church which aided materially in overcoming resistance among many of the foreign born, who tended to resent what they considered interference with their personal liberty.

6. The coöperation of the medical profession.

7. The educational appeal through bulletins, posters, letters, the radio and the newspapers.

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The Doctor's Job

"To my mind, these are the attitudes of an honest, earnest, well trained doctor of today:

He is unafraid. The doctor's job, whether his present concern is private practice or public health, is paramount to the nation's welfare. Whatever the political framework of tomorrow, there will be a place for him and a place in the sun.

He continues to learn. He feels a maladjustment in the society he serves, and he seeks to understand it in the whole as well as in part. He considers with an open mind at least two sides of a suggestion: his own and the patient's. He is eager for new information; he faces facts.

He participates. If he is a practising physician, he is active in obtaining and maintaining a first class health depart-

ment for his community. If it is partisan-ridden, he helps to turn the rascals out and to change the rules so that a good job is possible: If he is a health officer, he keeps close to clinical medicine and medical research. He takes counsel with private physicians; he is familiar with their problems.

He plays fair. He is not petty himself nor will he tolerate the factional bitterness which has made so many a medical organization the synonym for strife.

And last, he looks ahead, in terms of the community and the nation, as well as himself and his profession. He is a good citizen."—Thomas J. Parran, Jr., M.D., Health Services of Tomorrow, *Transactions of the College of Physicians of Philadelphia*, 2, 1:75, 1934.

Contribution of Public Health Nursing to Maternity, Infancy, and Preschool Age Group^{*}

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AS we look back along the way which public health nursing has travelled we note general trends and tendencies. With the modern public health movement, prevention became the keynote.

Obviously the preventive program should be started with the individual before birth. If it is true, as Dr. Haven Emerson has said, that the pregnant woman, the little children, and the sick-a-bed are the only groups in the community genuinely interested in their bodies, these groups afford the public health nurse her opportunity for effective health teaching.

The prevention of maternal deaths and the saving of infant lives are public health activities. Upon the shoulders of the public health nurse rests largely the responsibility of getting in touch with prospective mothers as early in pregnancy as possible and urging the necessity for continuous medical and nursing supervision throughout the maternity cycle. The public health nurse explains and demonstrates to the mother the principles of personal hygiene and helps her apply them in the everyday care of her baby.

The interests of the preschool group were formerly lost sight of because of the more pressing needs of infants. No

longer can the preschool period, so important to later adult life, be referred to as the neglected period, since the public health nurse seeks out those children with defects and works for their correction. She is attentive to the nutritional and growth needs of this period and she spreads the good news of diphtheria and smallpox immunization. Perhaps the nurse makes her most important contribution to child welfare when she teaches the mother the elementary principles of habit and character training and helps her to guide the child along the way of wholesome self control and development.

The present economic situation has increased enormously the social problems affecting public health. It is reassuring to realize that so many public health nursing organizations have stood firmly for the principle that dispensing material relief is the function of social workers and not the function of nurses. Coöperation with social agencies to obtain necessary relief for patients has been developed as never before but, considering the pressure, public health nurses have done remarkably little relief giving.

In placing the emphasis on education, care should be taken that the pendulum does not swing too far away from bedside nursing. If we analyze frankly the reason why the nurse has been chosen for so important a part in the public health educational program,

^{*} Abstract of paper read before the Public Health Nursing Section of the American Public Health Association at the Sixty-second Annual Meeting in Indianapolis, Ind., October 10, 1933.

we must admit that it is because of her nursing and not her teaching ability. Bedside nursing offers the public health nurse her golden opportunity to teach. Educators today are constantly looking for practical projects with which to teach their subjects. The nurse's projects are right at hand when she arranges the toilet-tray, when she rearranges the sick room to allow ventilation without drafts, when she gives the baby a bath, when she disposes of body discharges. It is the most effective method of teaching for lasting results.

In the report of the Committee on Municipal Health Department Practice we find the following:

The question whether the public health nurse should or should not render bedside care has been hotly debated during the past few years. The arguments for purely instructive service rest mainly on two grounds—the administrative difficulties involved in the conduct of private sick nursing by official health agencies, and the danger that the urgent needs of sick nursing may lead to the neglect of preventive educational measures which are of more basic and fundamental significance. On the other hand, the plan of instructive nursing divorced from bedside care suffers from defects which are in reality more serious. In the first place it creates a duplication of effort. There must be a nurse from some other agency employed in the same dis-

trict to give bedside care. Second, the field worker who attempts health education without giving nursing care is by that very fact cut off from the contact which gives the instructive bedside nurse her most important psychological asset. With a given number of nurses per unit of population, we believe that the combined service of teaching and nursing will yield the largest results.

Today, when it is so important to obtain the utmost in value for each dollar spent, a course in fundamental teaching principles, practically applied to public health, if made available to all staff nurses, would probably do more than anything else to increase the effectiveness of home visits.

The nurse is the central figure in the modern public health campaign. However, the nurse cannot stand apart and operate as a unit independent of all others; she must promote friendly, courteous relationships with all the social agencies of the community. There is no individual upon whom the nurse is more dependent, if her work is to be effective, than the health officer. Dr. Geiger of San Francisco stated recently, "The relationship between the health officer and the public health nurse must be founded on mutual trust and respect, and their aims in public health work must be identical."

54th Annual A.W.W.A. Convention in New York

THE coming 54th Annual Convention of the American Water Works Association is to be one of the most instructive, interesting and entertaining conventions yet held.

The meeting will be in New York and there will be present a number of prominent men—consulting engineers, chemists, operators, management and finance authorities.

Reports will be made of the activi-

ties of the National Recovery Committee for Water Works Construction and the part that they have played to date in obtaining allocation of federal funds in excess of \$200,000,000 for the construction of water works and sewage projects and filing of applications for an additional \$660,000,000 for further work.

Members of the A.W.W.A. should remember the dates—June 4 to 8.

CHILD HYGIENE

MATERNAL DEATHS

A Brief Report of a Study Made in 15 States*

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SCOPE AND METHOD OF THE STUDY

"The maternal mortality rate in this country is generally recognized as high, and it has shown comparatively slight changes over a period of years. Moreover, information hitherto available concerning maternal deaths consisted only of such limited data with regard to all deaths in a given area as are contained in death and birth certificates and more detailed studies of selected groups. The former were not sufficiently detailed nor the latter sufficiently general to give a picture of the conditions contributing to the 16,000 deaths assigned annually in the United States to causes that are associated with pregnancy and childbirth. At the 1926 conference of state directors in charge of the Maternity and Infancy Act, the chairman of the Children's Bureau obstetric advisory committee presented a plan for a comprehensive study of maternal mortality. It was decided to undertake such a study only in states which were included in the birth registration area and in which both the state board of health and the state medical society made formal request for it. The U. S. Children's Bureau undertook to prepare, with the assistance of its obstetric advisory committee, a schedule for use in all the states studied, and to report the findings. In the preparation of the schedule standards of prenatal care previously set up by the obstetric advisory committee were considered, as were hospital standards and standards of obstetric care in hospitals approved by the American College of Surgeons.

"The material here presented is an abstract of the full report, with tables and careful analyses, of the resulting study made by the U. S. Children's Bureau of all the maternal deaths which occurred in 13 states in 1927 and in these same states and 2 others in

1928. The states in which the study was conducted for both years were Alabama, Kentucky, Maryland, Michigan, Minnesota, Nebraska, New Hampshire, North Dakota, Oregon, Rhode Island, Virginia, Washington, and Wisconsin. California and Oklahoma were included in the 1928 study only. In Michigan, Wisconsin, Minnesota, North Dakota, California, and Oklahoma all or most of the schedules, and in Alabama some of them were taken by physicians on the staffs of the state departments of health. In the remaining states the schedules were taken by physicians on the staff of the Children's Bureau.

"The states of the study are fairly well distributed geographically and fairly typical of the sections in which they are located. The composition of the population for the group of states conforms very closely to that of the entire United States according to the census of 1920.

"In these 15 states, during the years of study, the deaths of 7,537 women were assigned to puerperal causes by the U. S. Bureau of the Census in accordance with the *International List of Causes of Death*. This number of deaths was 26 per cent of the 29,298 deaths from puerperal causes in the entire United States birth registration area for these 2 years. In the states of the study 3,546 (47 per cent) of the maternal deaths were urban and 3,991 (53 per cent) rural; in the birth registration area for these 2 years 54 per cent were urban and 46 per cent rural (rural including towns of less than 10,000). Eighteen per cent of the deaths in this study and 19 per cent of the maternal deaths in the birth registration area were of colored women. Colored women, according to the definition used by the Census Bureau, include Negroes, Japanese, Indians, and Chinese.

"As there were 1,176,603 live births in the states during the years of the study, these 7,537 deaths gave a maternal mortality rate of 64 per 10,000 live births; in the birth

* United States Department of Labor, Children's Bureau Publication No. 221, 1933.

registration area for 1927 and 1928 together the maternal mortality rate was 67. Conditions as regards maternal mortality were evidently better in the states studied. The 4 states admitted to the birth registration area in 1928 all had higher rates than the area as a whole for that year; if they had been in the area in both years of the maternal mortality study the rate for the area for the 2 years would probably have been higher.

"The regions studied, then, are probably fairly representative of the United States as a whole, with some overemphasis on the Pacific Coast and North Central States, and some underemphasis on the Rocky Mountain regions, the far South, and the eastern industrial centers. Conditions as regards maternal mortality were apparently better in the regions studied—they were certainly not worse—than those obtaining in the United States as a whole.

"The collection of data was begun in February, 1927, and most of the schedules were completed before July 1, 1929. All the finished schedules were sent to the Children's Bureau for statistical examination, and tabulations were made there. A very close contact between the interviewers and the Bureau was maintained in order to keep the interpretation of the schedules uniform.

"The routine used was as follows: All certificates of deaths assigned to puerperal causes as reported to the state departments of health were copied. Birth certificates were matched when possible. The physicians or other persons signing the death certificates were then interviewed. The families were not visited, except where there were no physicians. The hospitals and clinics in which the patients had received care were visited, and the case records were studied with the consent of the attending physician. In some cases in which the interview was delayed the physician had forgotten many of the details of the case. Very few of the physicians kept case histories, and usually no laboratory work other than a urinalysis and a blood pressure examination had been done. However, most of them remembered the cases vividly. The physicians interviewed cooperated most heartily, giving freely of their time and helping in every possible way."

RECOMMENDATIONS BY ADVISORY COMMITTEE

"Maternal deaths are due in large part to controllable causes. But how is control of these causes to be established? First, the medical profession and the public must know the facts, and then each group should take appropriate and decisive action. Physicians

have the responsibility for leadership in both the medical and the community program for such control. As the facts become more widely known, others will assume this leadership if they do not.

"Recommendations for action looking to prevention of maternal deaths are addressed to the medical profession and to the general public.

TO THE MEDICAL PROFESSION

"A. Physicians must assume the leadership in the field of maternal care by:

1. Informing the public that the high mortality during pregnancy, delivery, and the postpartum period is due largely to controllable causes.

2. Recognizing that every mother must have adequate prenatal, delivery, and postpartum care.

3. Instructing the public as to what constitutes adequate maternal care.

4. So organizing the available resources of their communities that every mother can receive adequate maternal care.

5. Warning the public as to the dangers occasioned by abortions, spontaneous or induced.

"B. In order that more accurate information may be secured relative to cause and prevention of maternal deaths:

1. Physicians should make a greater effort to study by autopsy and other scientific means every maternal and fetal death, for in many cases this is the only means of ascertaining the true cause of death.

2. Physicians are urged to exercise the greatest possible care in making out maternal and fetal death certificates, so that vital statistics may be more accurate and therefore more valuable.

3. Bureaus of vital statistics are urged to query maternal and fetal death certificates recording an indefinite cause of death; for example, 'Caesarean section' alone.

4. Medical societies and departments of health in cooperation should investigate each maternal death within a few weeks of the death.

"C. In order that physicians in general may have a better understanding of the fundamentals of obstetric care:

1. There should be larger and better facilities for clinical training in obstetrics.

2. Undergraduate students should have a much wider contact with obstetric patients.

3. The state medical societies, the medical schools, and state departments of health should provide or arrange for postgraduate

teaching in the various counties in order to keep the local practitioner in touch with the best obstetric thought and practice.

"D. It is recommended that all physicians practising obstetrics give particular consideration to:

1. The importance of good aseptic technic, including the use of rubber gloves and masks that cover nose and mouth
2. The dangers to mothers from carriers of infection
3. The dangers of the use of pituitrin during labor
4. The dangers of multiple, forcible, and radical procedures in obstetrics
5. The proper indications and contraindications for various obstetric operations, especially (a) the dangers of major operations in the presence of shock and hemorrhage, and (b) the dangers of Caesarean section after vaginal manipulations or long labor
6. The proper selection of anesthetics
7. The value of blood transfusions
8. The dangers of intrauterine manipulation in cases of infected abortion
9. The dangers of abortion or delivery to women suffering from acute diseases, especially infectious diseases
10. Knowledge of the symptoms of some of the less common but more serious complications of delivery such as rupture of the uterus

"E. It is recommended that state medical societies working in coöperation with the state departments of health consider the development of some plan by which well trained regional obstetric consultants may be made available.

TO THE GENERAL PUBLIC

"There should be widespread education of the public as to the following:

1. That the high maternal death rate is due largely to controllable causes.

2. That it is necessary for all women to have adequate supervision and medical care during pregnancy, labor, and the postpartum period, such supervision and care to begin early in pregnancy and to be continuous through the postpartum period—

a. In order to safeguard the health of both mother and child.

b. In order especially to control the infections, toxemias, and hemorrhages that this study and others have shown to be real menaces to life.

3. That there is danger of death or serious invalidism following abortions, spontaneous or induced.

4. That the community has a definite responsibility to provide adequate medical and nursing facilities for the care of women during pregnancy, labor, and the postpartum period. This predicates the proper organization of hospitals, outpatient services, and medical and nursing personnel and applies to both home and hospital care. The community should know the standards for hospitals taking obstetric cases that have been drawn up by the American College of Surgeons.

5. That judicious selection of the hospital to be used for maternity care is of the greatest importance when hospitalization is planned.

6. That the better education of those caring for women during this period is essential and should have public support. This includes adequate obstetric training for medical students, postgraduate obstetric training for physicians in practice, to keep them abreast of modern developments, the training of nurses in good maternity care, and the training and supervision of midwives in communities where midwives still practise.

7. That it is important to make careful and intelligent selection of the attendant for maternal care."

SCHOOL EXCLUSIONS FOR GONORRHEAL INFECTIONS IN WASHINGTON, D. C.

THE following is quoted from an article by Ella Oppenheimer, M.D., and Ray H. Everett (*J. Soc. Hyg.* 20, 3:129-138 [Mar.], 1934):

Because many individuals and organizations in Washington, interested in children and in the control of venereal diseases, felt that some provision should be made for the education

of children who apparently were excluded from school for relatively long periods of time due to venereal disease, a limited (April-June, 1932) study* was undertaken by the U. S. Children's Bureau and the Social Hygiene Society of the District of Columbia. Its

* This work and detailed report thereon are in *Public Medicine*.

aims were to determine the facts regarding the probable numbers of such children, the period of their exclusion from school, aspects of their social and economic background and of their treatment and treatment facilities in Washington which had a bearing on the problem. Because an individual with syphilis is rendered non-infectious from the point of view of ordinary social relationships after a few treatments, the study was limited to venereal disease of gonorrheal or presumably gonorrheal origin.

The study was made possible by the coöperation of the Health Department, the Attendance Department of the Board of Education, the Children's Hospital, the Board of Public Welfare, the Juvenile Court and other agencies. This report presents a summary and brief comments on the conditions found.

SUMMARY OF FINDINGS

1. A total of 321 school children, 259 girls (210 colored and 49 white) and 62 boys (55 colored and 7 white) were found listed by the four agencies whose records were studied, as having either a definite or suspicious gonococci infection. (The 321 individual children involved 537 records, 159 being recorded by one agency only, 110 by two, 50 by three and 2 by four agencies.)

The ages of these 321 individual children ranged from a small number under 6 years to one 21 years of age. Most of them were of compulsory school age (7-15 inclusive). All under 7 years of age, and 16 and over, had actual records of school exclusion. The predominance of girls, and of the colored is evident. Sixty-five per cent of the individuals whose records were studied were colored girls, approximately half of whom were adolescent. Among the white there were few in the adolescent group.

2. The data gathered indicated that the extent of school exclusions because of gonococcal infection among children in the District was not as great as had been indicated in a previous report. Although the range of exclusion periods was great, large numbers of children whose exclusions appeared on the records to have been greatly prolonged were at institutions where full- or part-time school work was available. This does not minimize the undesirable consequences to the child with a school exclusion of several months. The period of exclusion tended to greater length in the adolescent age groups.

3. Considerable evidence was gathered of faulty reporting to the Department of Health. Approximately 35 per cent of the total 321 children listed by the four agencies whose

records were studied, were not registered for exclusion by the Department of Health.

4. It was found that very few children were actually out of school during the entire period of their official exclusion; also that some children who had been authorized to return to school were still out of school.

5. Children were found excluded from school but not under regular medical supervision and treatment because of failure of parents to understand the need for it, economic and social conditions, and inadequate social service follow-up.

6. Information available at various agencies on individual children who were also visited in their homes indicated a woeful lack of exchange of accurate information in regard to the child's condition among the various interested agencies. Incorrect and frequently distorted statements regarding the venereal diseases were frequently noted in social case records.

RECOMMENDATIONS

1. Reporting to the Department of Health by all clinics, hospitals, and physicians treating these cases should be stimulated.

2. Provision should be made for adequate check-up in regard to school attendance of all cases officially excluded from school, and also for adequate medical supervision of these children. Responsibility for the former would seem logically to rest with the Attendance Department, responsibility for the latter would seem to rest with the Health Department.

Whatever measures are mutually agreed on by these two public agencies should assure such record-keeping, medical treatment and follow-up as will guard both the health and educational rights of the child. Absolute lines of demarcation between the duties of the two departments cannot be laid down here. Responsibilities should be assumed on the basis of functional objectives. For instance, it seems logical that continuance of medical treatment should be a responsibility of the Health Department and this involves such follow-up as may be necessary to assure an adequate continuity of treatment. Similarly continuance of education is the concern of the Department of Education. The community may fairly charge this department with the duty of checking up on exclusions and keeping in touch with every case so that the exclusion period may be made as brief as possible.

3. Provision should be made for the instruction of those children within the compulsory school attendance age who are ex-

cluded from school and are not in institutions.

4. It should be recognized that this problem of children, largely girls, who are excluded from school because of gonococcic infection has two aspects, first that of the young child, and second, that of the adolescent individual whose infection frequently has been due to sexual relations. The special needs—both social and medical—of each group should be met.

Neglect both of health teaching and sex education in school and home, together with lack of wholesome recreation facilities are responsible for many infections in the adolescent group. The school and health department workers responsible for dealing with these children should be qualified to aid them to a better understanding of sex problems. The provision of better recreational facilities

is a community responsibility in which both public and private agencies should take a part.

The occurrence of the infection in the young child indicates, as has been repeatedly emphasized in the past, the importance of further careful studies on the epidemiology of gonorrheal infections.

5. A series of lectures should be arranged for social workers, and others, covering the social and medical aspects of the venereal diseases in children. (The Social Hygiene Society has already planned such an institute for the District of Columbia.)

6. The desirability of further scientific research on the whole subject of gonorrheal infection and its treatment is indicated by this study as by many others. Every effort should be made to make such research possible.

INDUSTRIAL HYGIENE

Medical Study Trip to Hungary
—At the invitation of the Hungarian Medical Postgraduate Committee of Budapest, an American Committee has been organized to promote a medical study trip to Hungary, August 18–Sept. 28, 1934, headquarters St. Gellert Hotel, Budapest. The American Committee consists of Dr. Ervin Torok, Chairman, and Dr. Richard Kovacs, Secretary (1100 Park Avenue, New York, N. Y.). It is proposed not to have “1 and 2 night stands,” while en route, but to spend most of the time in Hungary with, however, 5 days’ stay in Munich and an opportunity to attend the Passion Play at Oberammergau. Archduke Dr. Joseph Francis, President of the Budapest Medical Association, assures that everything will be done to make the stay in Budapest most successful not only from a scientific but also from a social point of view.

13th Annual Report, Industrial Health Research Board—This is for the year ending June 30, 1933. The investigations have covered (1) En-

vironmental conditions—lighting, noise, vibration, dust, the physiology of heating and ventilation; (2) the physiology and psychology of work; (3) sickness and absenteeism; and (4) vocational suitability.

An investigation was made of the effects of vibration on workers using vibrating tools and machinery. It was found that marked chilling of the fingers followed vibration, and that the recovery of the circulation in the fingers was definitely delayed. During vibration the increased air movement caused an increased cooling power, but the physiological effects were greater than could be accounted for by this circumstance. It was also found that the hands of such workers showed an increased susceptibility to cold. The fingers also developed cyanosis on immersion in water between 59° and 68° F. which was not the case with the normal hand. The wearing of gloves did not prevent these phenomena. Such vibrations did not appear to increase metabolism nor to affect the pulse rate.

In the spinning section of the cotton industry, the dust and cotton fiber is

productive of an excessive amount of respiratory disease. Professor Maitland in Manchester found that histamine may be present. This gives a clue to the irritant causing "card-room asthma" which may in turn lead to possible "desensitizing" of susceptible individuals.

Much work was done with precision instruments in determining warmth and comfort as with the eupatheoscope, the kata-thermometer, and the globe thermometer. There are many other interesting summaries in this Report.—H. M. Stationery Office, 1933, 36 pp., price 9d. net (procurable from the British Library of Information, 270 Madison Avenue, New York, N. Y.).

Occupation and Health—Brochures Nos. 324–332 (rice-field workers, road makers, scavengers, silicon, silk, skin, social welfare, soldering, soot, and sport), and Nos. 333–344 (strontium, cinema studios, submarines, sumac, syphilis, talc, taxidermists, temperatures, tetanus, textiles, thallium, thorium, tobacco, and toluene) have now appeared in this series of monographs from the International Labour Office. It is stated that the series is complete through the letter "S." Obtainable from L. Magnusson, U. S. Branch, Jackson Place, Washington, D. C.

Occupational Disease Summary, New York, 1933—A report from Director J. D. Hackett of the State Division of Industrial Hygiene (80 Centre Street, New York, N. Y.) shows that a total of 866 occupational diseases were reported for the year 1933 as compared with 610 the previous year. The outstanding difference occurred in respect to reports of poison ivy which increased from 30 in 1932 to 131 in 1933.

The leading afflictions reported in 1933 were due to amido-benzol com-

pounds 33; calcium hydroxide 15; carbon monoxide 30; cement 16; chrome 22; dermatitis, non-occupational 40, occupational 50, and unknown 13; diseases not specified 28; dyes (furs 22, leather 2, silk 2, not specified 7), total 31; friction 30; hydrogen sulphide 10; lead (various forms) 82; poison ivy 131; soap 27; soap powder 39; sodium carbonate 11; sodium hydroxide 13. A rather large number of scattered causes contributed up to 10 reports each.

A considerable increase of dermatitis reports over the year 1932 was mainly due to the enlargement of the scope of the Compensation Act.

It still remains a fact that about half the scheduled poisons and diseases of the New York State Workmen's Compensation Act are practically inoperative. There were no cases under seven of the headings and only one or two cases at maximum in seven more; that is to say, out of 27 of the scheduled poisons, about half, only, mean protection for the worker.

Occupational Disease and Compensation—This is a closely knit summary of occupational diseases reported in New York State during the year 1933, Part I being included in this issue, and pertaining to claims classified according to the decision of the referee, to the number of hearings and disposition of cases, to the length of disability and disposition of cases, and to the alleged causative agent and disposition of cases. The total cases considered was 692, of which 283 were disallowed, 250 given awards, and 154 were pending at the end of the year. Part II will consider the diagnoses and occupations of claimants.—Division of Women in Industry, *Indust. Bull.*, New York Department of Labor, Albany, 13. 2:37–39, 42 (Feb.), 1934.

Occupational Disease Summary, Ohio, 1933—The Bureau of Occupational Diseases, State Department of

Health, reports (Sect. 1243-1) a total of 1,258 occupational diseases in 1933 as compared with 1,159 in 1932. These gross figures are practically the same as for each of the preceding 5 years.

Of the 21 afflictions which are *compensable* under the Ohio law (Sect. 1465-68a), only 16 registered reports. Of these, dermatitis (variously specified) comprised 726, tenosynovitis 191, lead poisoning (and lead absorption) 134, chrome ulceration (nasal or skin) 20, prepatellar bursitis 19, brass or zinc poisoning 12; volatile petroleum products 9, potassium cyanide poisoning 5, benzol poisoning 3, compressed air illness 3, sulphur dioxide poisoning 2, and 1 each of the following: phosphorus, arsenic, carbon bisulphide, tar epithelioma and carbon dioxide,—total 1,129. In addition, 104 *non-compensable* occupational diseases were reported where the causative agent was specified, and 25 where only the nature of the affliction (as bronchitis, tuberculosis, etc.) was stated. Chief among the non-compensable diseases were those due to dust inhalation, total 47, principally silicosis. Copper-sodium cyanide also comprised 23 in this group.

Of the 1,258 occupational diseases, 300 occurred through inhaling the substance, 732 by way of the skin, 202 through strain, and 23 through friction.

Acute mishaps, even though due to poisons, sudden strains, etc., are not included in the above figures.

Lead poisoning occurred in various industries: storage batteries 51; paints, dry colors, and painting 15; lead manufacture or recovery 14; automobiles 8; printing and publishing 8; caskets and vaults 5; pottery 4; sanitary ware 4; rubber 3; and the balance scattered. Approximately half of the lead poisoning cases were considered to be no more than lead absorption. Only one female worker (tile scraper) was involved.

Of the 732 total cases of *dermatitis*, 142 occurred among females. The lead-

ing causes of dermatitis were exposures to alkalis and cleansers 47, bakelite 22, gasoline 39, chromium compounds 24, dyes and dyed goods 42, lime and cement 33, oils and cutting compounds 109, paints, enamels, etc. 15, fungi, etc. 21, plants, woods, etc. 28, plating solution 18, rubber 39, and textiles (probably dyed) 24. Females led in leather, textiles and fungi, etc., and practically equalled males in solvent cements and dyed goods.

From the date of the receipt of the first reports, May, 1913, a total of 15,887 occupational diseases have been reported to and including December 31, 1933. During the first 8 years, before occupational diseases became compensable, only 2,575 or an average of 322 cases per year were reported. Since compensation began (August 4, 1921), 13,312 have been reported, or an average of 1,065 per year.

Occupation Hazards and Diagnostic Signs—This guide to impairments to be looked for in hazardous occupations is a revision of former *Bulletin No. 306*, published in 1922. The material has been considerably extended with inclusion of much new information in particular on radiant energy, but also on the risk of 94 poisons as respects their industrial occurrence with a brief line or two for each in regard to symptoms and what to look for. There are also covered (A) Abnormalities of temperature and humidity, (B) Compressed air, (C) Dampness, (D) Defective illumination, (E) Dust, (F) Infections, and (H) Repeated motion, pressure, shock, etc. The symptoms, conditions or diseases cited are those which are reported in the best works available on the several hazards. There has been a complete revision of the method of presenting some of the hazards, although the number of hazard groups remains the same. The number of hazardous occupations

has been increased to approximately 900. There are 9 pages devoted to the alphabetical list of hazardous occupations, each of which is cross-referenced to a list of hazards, etc. While the works of many have been consulted, the authors acknowledge especial indebtedness to Dr. A. J. Lanza and Dr. William J. McConnell.—Louis I. Dublin and Robert J. Vane (Met. Life Ins. Co.), *Bulletin 582*, U. S. Bureau of Labor Statistics, 1933, 52 pp.

Report to the General Court of the Special Industrial Disease Commission, Massachusetts—This Report of 215 pages issued under date of February, 1934, is obtainable from the Division of Occupational Hygiene, Department of Labor and Industries, State House, Boston. It followed upon the Acts and Resolves of 1933, approved by the Governor, July 12, 1933, which provided for investigation of certain questions relative to the granite and foundry industries and of the problem of industrial disease compensation generally.

Part I is devoted to working conditions found as a result of surveys of these two industries, Part II of such working conditions on the health of workers particularly as regards silicosis with some study of mortality rates. Silicosis was found in a representative group of granite workers to the extent of 15.2 per cent, and silicosis with tuberculosis. 7.6 per cent. Positive correlation was found between the duration of the exposure and dust concentration. Tuberculosis deaths were one-third of all deaths of granite workers. Silicosis was found in 8.8 per cent of a representative group of foundry workers and silicosis complicated by tuberculosis in 2.6 per cent. Pneumonia was the final cause of death in about one-fourth of all the foundrymen. One section is devoted to silicosis compensation statistics. Petro-

graphic determinations including the sericite content of a number of granite and foundry dusts showed same to be very rare in Milford and Westford granite, present to the extent of about 30 per cent of the finer material in Fitchburg and to about 10 per cent in Quincy granite. In foundry dusts, usually little or no sericite was found, but in some instances, as many as 20 particles of sericite were found to 100 particles of dust, and 45 particles in dust from an enamel spray booth (considering only particles less than 10 microns in diameter).

Part III considers means of lessening dust exposure, and Part IV, legislative and administrative aspects of the problem. In the latter, a summary is given of laws in other states and countries followed by a discussion of the Massachusetts situation and a brief mention of the Taunton case where, in April, 1933, some 42 foundrymen were summarily discharged, following physical examinations by a local physician at the behest of an insurance company, on the theory that they were suffering from silicosis or tuberculosis. The Commission finally secured a total payment of over \$17,000 for payment of compensation for the entire time they were out of work and the Commissioner of Public Health found that 41 were fit to return to work which they did.

A most important part of the report is the recommendations (pages 181-189) which should be read in full by those interested. They can also be secured in a separate mimeograph form. Briefly, they cover definitions, preventive regulations, certificate of compliance with regulations, employers must provide insurance, insurers must carry certificated risks, entrance physical examinations, annual physical examinations, compensation for pulmonary disability restricted, all persons exposed subject to preventive regulation, physicians' reports paid for and

privileged, schedule and experience rating for occupational disease risks, cancellation of policies restricted, the creation of a Division of Occupational Hygiene in the Department of Labor and Industry (with a personnel having special knowledge of the causes and prevention of occupational diseases and sufficient to make the required investigations and evaluate hazards in cooperation with the Department of Public Health so as to promote occupational health and safety education), the addition to the personnel of the Division of Adult Hygiene of the Department of Public Health of an occupational medical staff with such assistance and facilities as necessary to efficient performance, the creation of a Medical Board of Review composed of three physicians (a clinical pathologist, a roentgenologist and a chest disease specialist), and arrangements for statistical data to be collected by the Department of Industrial Accidents. Various legislative drafts (Massachusetts) complete the Report.

A Test of the Capacity of the Nose to Collect Dust—Dr. Gunther Lehmann of the Emperor William Institute for the Physiology of Work has worked out a method to determine what percentage of the inspired dust can be retained by the nose. With this method, dust-laden air is blown into the nose, and the air, while the breath is being held, emerges from the mouth. By means of two konometers, the concentration of the dust is measured before it enters the nose and after it emerges from the mouth. It was found that many noses retain up to 75 per cent of the inspired dust, whereas others allow virtually all the dust to pass out. The concentration of the dust plays a small part; likewise the velocity of the air in motion, and the chemical nature of the dust. The observations made it seem that persons with poor dust fixation

capacity of the nose are particularly disposed to pneumoconiosis. Therefore 89 stone cutters who had worked in stone from 10 to 30 years were examined. Of this number 53 were healthy, while 36 had pneumoconiosis. The dust fixation capacity of the healthy workmen averaged about 52.3 per cent, while the average of the workmen with pneumoconiosis was about 22.3 per cent. Of the 46 stone cutters with a dust fixation capacity above 40 per cent, only 2 presented pneumoconiosis, while 44 were exempt. Of the stone cutters with a dust fixation between 29 and 40 per cent, 5 were ill and 5 were healthy, while 2 were showing just the first symptoms of disease. Of the 31 stone cutters with a dust fixation capacity under 29 per cent, only 2 were healthy, while all the others were affected with pneumoconiosis. A good dust fixation capacity of the nose affords therefore almost complete protection against pneumoconiosis, whereas persons with poor dust fixation capacity, under corresponding conditions, are almost certain to develop pneumoconiosis. Applicants for work as stone cutters should be given this test, and those with poor dust fixation capacity should not be allowed to work where a menace of silicosis exists.—*J.A.M.A.*, 102, 6:471 (Feb. 10), 1934.

The Physiological Response of the Peritoneal Tissue to Dusts Introduced as Foreign Bodies—This is a report of an important investigation having a bearing on pneumoconiosis. Summary.

1. A definite quantity (0.2 g.) of dust in suspension was injected intraperitoneally into guinea pigs.

2. Dusts of 2 particle-size groups were used—one of the screened material with particles less than 43 microns (325 mesh), and the other of air-separated material with particles varying from less than 2 to 8 microns in size.

3. The animals injected with the coarser material were examined 7, 14, 30, 56, and 112

days after injection, and those treated with air-separated material were examined after 7, 14, 30, 56, and 90 days.

4. The response caused by the dust in the peritoneal cavity was constant in all of the animals injected with an individual dust and could be classified as an absorption, proliferative, or inert reaction.

5. In the absorption reaction the injected dust disappeared from the peritoneal cavity without the production of scar tissue.

6. In the proliferative reaction the nodules produced by the dust continued to increase in size up to 112 days after injection, the maximum duration of the tests in this series.

7. In the inert reaction the amount of injected dust remained approximately the same in the peritoneal cavity throughout the various periods, but the nodules became more flattened and fine particles of dust were carried over rather extensive areas in the peritoneum by phagocytes.

8. Calcite, limestone, precipitated calcium carbonate, gypsum, and cement exhibited an absorption reaction.

9. Quartz, chat, and flint produced a proliferative reaction.

10. Soapstone, carborundum, jeweler's rouge, anthracite coal, bituminous coal, and precipitator ash were inert in reaction.

It is concluded that the peritoneal response to injected dust is of such character that it may be used as a basis for the classification of industrial dusts from a physiological standpoint. Tests of longer duration are now in progress to determine the ultimate fate of the dust in the peritoneal cavity. However, 90 days appears to be a sufficient time.—John W. Miller and R. R. Sayers, *Pub. Health Rep.*, 49, 3:80-89 (Jan. 19), 1934, illustrated.

Gas Hazards in Sewers and Sewage-Treatment Plants — These hazards are those due to inflammable and poisonous gases and to oxygen deficiency. The first two mentioned are derived from volatile liquids, leakage from gas mains, or the products of fermentation of sewage. Digestion tanks show chiefly CH_4 (70 to 85 per cent), CO_2 (10 to 20 per cent), and occasionally nitrogen and a trace of hydrogen. Septic tanks have

shown CH_4 (75-79 per cent), CO_2 (3.4-6 per cent), nitrogen (about 17 per cent), and occasionally traces of other gases. Imhoff tanks have shown CH_4 (80 to 85 per cent), CO_2 (7 to 20 per cent), and more or less nitrogen. None of the above gases are poisonous *per se*. Methane, of course, is both inflammable and explosive.

A considerable range of poisonous and explosive gases have been found in manholes, depending upon the character of discharges into sewers. The chief characteristics of some of these are given—ammonia, benzol, carbon dioxide, ethane, methane, gasoline, hydrogen sulphide, sulphur dioxide, and carbon monoxide.

Among precautions especially to be taken before entering manholes are those laid down by the National Electrical Safety Code: Never enter—

until you have assured yourself that it is free from dangerous gases, by testing with an approved safety lamp, by ventilation, or by other adequate methods.

The simpler tests are described. The absence of odors is no indication of safety. Great precautions should be taken to detect deficiency in oxygen as by the use of small animals, especially birds, but also by precision instruments. Hose masks and canister masks should also be at hand. The essential steps in resuscitation should be known (described). A bibliography accompanies.

The paper is reviewed by Emery R. Hayhurst, who recited some personal investigations he had made in connection with 4 sudden deaths in a silo (*J.A.M.A.*, Oct. 31, 1914, p. 1570) and 4 other sudden deaths in a vertical caisson (*A.J.P.H.*, Oct., 1925, p. 924). These last were practically duplicated in the Thames River catastrophe (*J. Indust. Hyg.*, Oct., 1932, p. 291). The various air analyses are given in connection with each of these 3 mishaps. The great regret is that rescuers so often lose their lives. Indeed, cases are on

record where the rescuer, evidently through his straining efforts, has lost his life while the victim, having been rendered unconscious and therefore breathing lightly, has been rescued and revived. Therefore the rescuer should proceed most cautiously, keeping in mind other help, a respirator, rope or cable, and above all, the necessity of stirring up the gaseous mixture so as to get fresh air down to the victim as well as for his own use. Thus stirring up the gaseous condition may be more effective than direct rescue. The point is to get fresh air to the victim the quickest way possible.

The principal paper is by Dr. R. R. Sayers.—*6th Ann. Rep.*, Ohio Conference on Sewage Treatment, Oct. 13-14, 1932, pp. 11-20 (Ohio Department of Health, Columbus), published March, 1934.

The Histopathology of Methyl Alcohol Poisoning—This study was made on 41 monkeys, 36 rabbits, and 81 rats. The alcohol was administered by inhalation, by skin absorption, and orally. The method of application made no apparent difference either in the type of lesions or in their severity. There was some variation in species, however, in regard to susceptibility—rats being the most and rabbits the least susceptible. Individual variations in susceptibility were also very marked.

The characteristic lesions of methyl alcohol poison are degenerative ones. Only the parenchymal tissues and neurones are affected. This granular degeneration may proceed to necrosis. There is practically never injury to connective tissue and therefore seldom any fibrosis. These changes are accompanied by a generalized capillary engorgement and edema. The pathological conditions in the eye are identical with those found elsewhere in the body. The edema is most marked in the retina and optic disc. Degeneration of the gan-

glion cells of the retina is sometimes followed by degenerative changes and fibrosis within the optic nerve. There may be multiple degenerations involving nerves other than the optic nerve.

Enlargement of the lymph nodes and the spleen was frequently found, a phase which it is planned to investigate further. Remarkable recoveries of blind animals, rendered so by the alcohol, were encountered even during the continued administration of the methyl alcohol. A considerable bibliography accompanies.—Ernest Scott, Mary K. Helz and Carey P. McCord, *Am. J. Clin. Path.*, 3, 4:311-319 (July), 1933.

Industry Reports—

Marble, Limestone, and Granite—December, 1933, VIII, 12:123-136

Insecticides and Spraying Operations—January, 1934, IX, 1:1-18

Glass Bottle Manufacturing—February, 1934, IX, 2:19-26

Cooperage—March, 1934, IX, 3:27-34

Each of these reports considers the extent and scope of the industry, conditions in typical plants, an exact description of the various manufacturing processes, the potential health-hazards, and a classification and index of jobs.—N. W. Pettys, Editor, Retail Credit Company, Atlanta, Ga.

Industrial Diseases in Denmark—

An investigation was made of the incidence of silicosis in various industries, beginning with the china industry which employs about 1,400 persons (to be published). An inquiry of 80 persons having 3 or more years' service with quartz-bearing stone showed silicosis in a marked degree in about 50 per cent, and these persons had about twice as many days of sick leave for respiratory ailments as the other workers, and 4 times as high as among workers in other occupational groups.

A new disease attributed to fluorite (cryolite) affected the structure of the

bones consisting in a thickening of the distal part and an ossification of the ligaments and muscles. The workers complained of pains similar to those of gout and showed a decrease in mobility of the limbs. They also had nausea, loss of appetite and vomiting. One woman who had worked under such exposure during several pregnancies had had children whose bones were not affected.—*Indust. & Labour Inf.*, XLVIII, 3:69-71 (Oct. 16), 1933.

Sickness Among Male Industrial Employees During the Final Quarter of 1933—The incidence rate of cases of illness causing disability for 3 consecutive days or longer among 154,000 male industrial employees was lower than in the corresponding period of any 1 of the 4 preceding years. This was due principally to a decrease in the non-respiratory diseases—a new departure since this is the first time that such diseases have decreased enough to lower appreciably the rate of total sickness. The 4th quarter rate for these afflictions was 37.5 per 1,000 men per year as compared with an average or expected rate of about 46.0 for the period. The reporting companies or sick benefit associations cover all parts of the country, but most of them are located in the North Central and North Atlantic States.—Dean K. Brundage, U. S. Public Health Service, B-409, 1934, 3 pp., mimeo.

Silicosis in Rochester—This discusses a deluge of common lawsuits for negligence falling upon various industrial employers in Rochester. These involve particularly silicosis, pneumoconiosis, and fibrosis of the lungs.—William S. McCann. *Bull. No. 82*, The Self Insurers Assoc., New York (466 Lexington Ave.), Jan. 2, 1934. 3½ pp.

Occupational Diseases: What It Means to Employers and the Ad-

ministrators of the Law—This is an article by Hon. Henry D. Sayer, Former Industrial Commissioner, and follows the above article by Dr. McCann (pp. 4-6).

Report of Conference Committee of Five in re Occupational Disease—Opinions and experience with the all-inclusive coverage of occupational diseases under a compensation law is reviewed. Such will breed speculative and wasteful litigation, create doubts and uncertainties and thereby needlessly increase the burden upon industry. Hence the present New York specific schedule plan is more reliable. If silicosis under proper safeguards and perhaps asbestosis were added, the New York statute would then be recognizing all important diseases known to arise from employment without making the law a general statute for "Health Insurance." The chief concern should be to make a risk "insurable," to insure *unknown* risks cannot be safely undertaken.

The creation of a medical board is regarded as essential. Special provisions should be made for silicosis and possibly asbestosis, but with proper safeguards and limitations. These afflictions should be divided into stages, as is done elsewhere, and compensation adjusted accordingly. The Act should not be retroactive. The employees should be obligated to certain regulations (1) for the prevention of silicosis, (2) periodical and medical examinations, and (3) the furnishing to employers, upon request, substantially accurate statements of previous employments and illnesses, during, say, 6 years immediately preceding.

The article continues with, "Which employer shall pay?" "Problems relating to cost," and "A special supplemental act desirable."—Compensation Insurance Rating Board, Jan. 11, 1934, 13 pp., mimeo. Association of Casualty

& Surety Executives, 1 Park Ave., New York.

Child Labor: Facts and Figures—About 50 codes under the N I R A had been approved by the President when this bulletin went to press (November 10, 1933). The subject matter covers:

(1) Child labor in the United States—boys and girls, 10 to 17 years of age, who in 1930 were gainfully employed to the number of 2,145,919, about one-third of whom were under 16 years of age, and more than 10 per cent under 14. Agricultural pursuits engaged 70 per cent between 10 and 16 years of age. However, there was a total drop between 1910 and 1930 in the proportion of children of this age group in agricultural occupations of 75 per cent.

Outside of agriculture, that is, in commerce, manufacturing, transportation, clerical and domestic work, etc., the proportion showed a decrease of 37 per cent from 1910 to 1920 and a greater decrease (58 per cent) from 1920 to 1930. At the present time workers 10 to 17 years of age, inclusive, constitute 4.4 per cent of all those gainfully occupied. Children under 16 constitute 4.5 per cent of all agricultural workers, 0.5 per cent of those in manufacturing, 0.4 per cent of clerical workers, 1 per cent of those in domestic and personal service.

(2) Children's work and working conditions.

(3) Legal regulations of child labor.

(4) A brief history of child labor comprises the rest of the Report, including tables in the Appendix.

Regulation is most common in manufacturing and in the extraction of minerals, followed next by stores and other business places. On the other hand, agriculture, domestic service and street trades are subject to little, if any, regulation. The present needs are: (1) to make the laws more comprehensive, (2)

to raise the minimum age standard, (3) to raise the age to which regulations apply, (4) to revise downward the maximum hours permitted, (5) to extend to minors increased protection against occupational hazards, (6) to improve administrative machinery, and (7) to coördinate better child labor and school attendance laws.—U. S. Children's Bureau, *Pub. No. 197*, 85 pp.

Workmen's Compensation for Occupational Diseases—This volume is stated to be a partial revision of the convention concerning workmen's compensation for occupational diseases, and the 5th item on the agenda for the 18th Session of the International Labour Conference to be held in Geneva in 1934. The subject matter is handled in 4 parts: (1) Compensation for occupational diseases—definition, distinguishing features, principles of legislation now in force, scope, medical coöperation in insurance, various insurance relations, statistics, and cost; (2) compensation for occupational diseases in various countries with a summary of legislation in table form (pp. 57–201); (3) silicosis—definition, physiopathology, statistics, symptomatology of the three stages, complications, diagnosis, prognosis, medico-legal aspects, cost of compensation, and bibliography (pp. 203–253); and (4) silicosis legislation—especially that related to various British possessions, but also an analytical table covering all countries (pp. 257–314). The conclusions pertain to the revision proposed (A) for including a certain number of occupational diseases comprising silicosis and (B) a rather complete substitution for 8 articles, having to do with the method of ratification by the different countries, and providing for revisions from time to time. The volume which comprises 328 pages is indexed. Part I also contains appendices concerning definitions and periodic examinations in unhealthy trades. Ob-

tainable from L. Magnusson, U. S. Branch, International Labour Office, Jackson Place, Washington, D. C., price \$1.50.

Pollution of the Air by Smoke—The author briefly reviews the history of the investigation of atmospheric pollution of which he has been superintendent of observations under the governmental Department of Scientific and Industrial Research for a number of years. The idea had its birth in London in 1911. The organization now has the coöperation of about 40 bodies, chiefly municipal authorities, and the maintenance of from 90 to 100 stations, which send their monthly deposit results to the author's office for compilation. Interest has continued to increase year by year.

The author, who is a physician, feels that the ciliated linings of the air passages of human beings, especially those who suffer from bronchial diseases, are injuriously affected by the suspended soot which contains tar and sulphur acids. Particularly men who have to work the hardest are the worst sufferers, since they are compelled to breathe more deeply than sedentary workers. In 1922 the author demonstrated (*Dust in Expired Air, Transactions* made by the Medical Society of London, Vol. XLV, 1922) that a fair proportion of suspended matter inhaled actually passes to the depths of the lungs. There are also to be considered the evil effects of cutting off daylight, sunshine and ultraviolet radiation, and the indirect effect due to the production of fogs.

Present condition shows that there was a steady improvement in the atmospheric picture of London and Glasgow until about 1921-1922, but since that date, very little if any improvement. There are many worse offenders than London and Glasgow. More drastic methods are required for dealing with pollution from factory chimneys, also

domestic fires. During the current year (1932) a general improvement was noted, the deposit of tar being 80 per cent, and the total solids being 86 per cent of the general average of the preceding 5 years. Apparently sulphur acids are most concentrated when smoke forms fog.—J. S. Owens, *J. State Med.*, 42, 1:51-58 (Jan.), 1934.

Facts on Disease of the Coronary Arteries, Based on a Survey of the Clinical and Pathologic Records of 762 Cases—Only "the incidence in relation to occupation"—a single paragraph—is excerpted from this paper:

Those who emphasize the rôle of the strain of 20th century existence in causing coronary disease, call attention to the numbers of business executives with great responsibilities who succumb to its ravages. Our figures do not lend support to this point of view (Table 7). The largest percentage of coronary cases was found among foremen and skilled workers, i.e., 44.2 per cent of the total autopsies in this occupational group showed coronary disease. The professional and executive group came second (39 per cent). Next in order of frequency came manual laborers, clerical workers, the semiprofessional and minor executive group, housewives, the retired or unemployed and, finally, the student group. (All of the students were under 25 years of age.) The differences are not great and, in this series at least, occupation has not seemed to play a highly selective part. The high incidence of coronary artery disease in a group of Jewish industrial workers has recently been pointed out, but the observations were not controlled by postmortem examinations.—

R. L. Levy, H. G. Bruenn, and Dorothy Kurtz, *Am. J. Med. Sci.*, 187, 3: 376-390 (Mar.), 1934.

The Prevention of Occupational Diseases—As a step toward prevention, "differential diagnosis" is of great importance. Most general practitioners count among their patients a very large proportion of industrial workers. The patient's description of his occupation is often most misleading.

A table on mule-spinners' cancer due to mineral oil, 1923-1933, shows the peak of cases to have been reached in 1927 and 1928 when there were 101 cases each year. These have fallen off to a total of only 39 in 1933. The decrease in deaths has been from 36 to 23. A second table shows the reported cases of industrial disease or poison (for England, Scotland, and Wales) for 1900, 1910, 1920, 1930, and 1933. Lead poisoning in particular has fallen off (1,058 to 168 cases, and 58 to 19 deaths).

The first step in prevention is the notification (reporting) by the medical practitioner. This includes also house physicians at hospitals. At this time only 2 definite forms of pneumoconiosis are well established—silicosis and asbestosis. The next step is comprehensive sanitation of the workplace. Another aspect is the medical examination of employees. Toxic agents should be prohibited only when an absolutely competent substitute has been found as, for example, leadless glaze in the potteries. Otherwise, regulations must prevent the absorption of toxic substances into the body. Those exposed to toxic substances should be periodically examined, keeping in mind the specific tests for the given poisons such as punctate red cells in lead exposure. The State Department has devised cautionary placards for display in connection with many harmful substances.

Apart from nystagmus and certain other diseases of miners, dermatitis stands out preëminently. A summarizing table by occupations is given for the years 1928-1932 which shows a gradual increase in these afflictions from 1,367 to 1,940. A central industrial clinic should be established not only for diagnosis but for the better training of medical students, also the facilities for research.—John C. Bridge (H. M. Senior Medical Inspector of Factories). *Lancet*, 5766:471-75 (Mar. 3). 1934.

Sulphur Dioxide for the Fumigation of Ships—Sulphur dioxide has been used for many years in the United States for the disinfection of ships. It was the principal method until 1914 when hydrocyanic acid was introduced. About 30 per cent of ship fumigations are still performed with sulphur. The methods of use, amount, and time of exposure, defects, effectiveness, toxicity, dosage, fumigation of loaded vessels, and hazards are described. There is still not sufficient accurate data at hand to evaluate this method.

It is tentatively suggested that the minimum standards should prescribe that concentrations of not less than 2 per cent SO_2 by volume should be produced in spaces fumigated, and that exposure should be for not less than 6 hours from the time of starting the gas nor less than 4 hours from the time when a 2 per cent concentration is reached.

—C. L. Williams, *Pub. Health Rep.*, 49, 3:89-100 (Jan. 19), 1934.

Methylene Blue in the Treatment of HCN Gas Poisoning—Author's conclusions:

It was apparent from these experiments on rabbits, white rats, and guinea pigs that injections of 1 per cent methylene blue solution were of no value in the treatment of hydrocyanic acid gas poisoning where the animals had absorbed, by breathing, lethal or near-lethal doses of gas in a short period of time. There was a slight variation of results in the different animals used, but the average of results indicated no advantage in favor of methylene blue treated animals.

—J. A. Trautman, *Pub. Health Rep.*, 48:1443-1447 (Dec. 1), 1933.

The Behavior of Lead in the Animal Organism. III—Colloidal Lead Compounds—Tertiary and secondary phosphates of lead, being relatively insoluble, are chemically and physiologically inert in the blood as compared to the soluble salts of lead and colloidal lead when injected intravenously. Thus soluble lead salts are not converted quantitatively into inorganic lead phos-

phates. The conclusion that lead is carried in the blood in the form of inorganic phosphates is therefore untenable.

Colloidal lead is almost as reactive in the body as the water-soluble salts of lead. In the treatment of malignant tumors selective localization of lead in tumor tissues is apparently small. The spleen and liver, as well as the lungs, may be expected to remove the greater proportion of lead from the circulation. Originally high concentration of lead in these tissues will diminish rapidly, except where the relatively inert lead phosphates are used, through the migration of the lead into the skeleton, and through excretion from the body.

Lead compounds are not stored in living tissues in inert form. Lead continues to be excreted from the tissues until there is a balance between that

which is being excreted and that which is being absorbed. The latter is the result of unavoidable contacts with lead materials and elsewhere. Lead deposition and metabolism in the tissues are not different in principle from those of the common mineral elements of the body.

There is a continued diminution in the actual quantities of lead found in the tissues (after intravenous injections) so that after a period of 5 or 6 months there is little evidence of a further drop in the total amount, due to the establishing of an equilibrium with the environment. The presence of such amounts of lead, months after its experimental administration, must not be interpreted as evidence of its retention by the tissues.—Robert A. Kehoe and Frederick Thamann, *J. Labor. & Clin. Med.*, 19, 2:178 (Nov.), 1933.

EDUCATION AND PUBLICITY*

From Chairman of Public Health Education Section—

Recognizing that much of the public health progress of the future will depend upon the development of successful methods of health education, the American Public Health Association some years ago organized the Public Health Education Section. Health education is rapidly becoming a specialty within public health. It is a necessity for both adults and school children. It plays an important rôle in health departments, schools, voluntary health associations, both local and national. There appears to be still some question as to whether the health educator is a soap box orator, a propagandist, advertiser, a scientist, or a

combination of all four. As soap box orators we have attracted only those who had nothing else to do but listen. As propagandists we have been suspected of exaggeration. As advertisers we have doubtless annoyed some to whom our message did not appeal. As scientists we have still to develop technics of proven effectiveness.

It is the purpose of the Public Health Education Section to serve as an open forum for the discussion of these and other problems so vital to our profession. The usual annual Health Education Institute will be held preceding the 63d Annual Meeting of the American Public Health Association in Pasadena, September 3 to 6, 1934. The theme of this year's institute will be School Health Education, although the discussions will be of equal value to those who are engaged in adult education.

* Health Education Section, supplies of printed material, or form of writing which appears herein, etc., to East C. Printing, 115 East 122nd St., New York, N. Y.

The program of the section, besides featuring a joint session with the Health Officers Section, will present discussions by experts, both from the East and the West, in our special field. At the closing session a specially appointed representative will summarize the highlights of what has gone on in other sessions of the section. It is a meeting which none interested in public health education can afford to miss.—W. P. Shepard, *Chairman*, Public Health Education Section, American Public Health Association.

"American Health Propaganda"
—As some of it looks to an Englishman, is discussed by Elwin H. T. Nash, Medical Officer of Health for Heston and Isleworth.

I have been asked to deal with publicity, mainly, I gather, from the point of view of publicity with a punch, owing to the fact that I have been investigating the various methods, particularly American, of pushing public health matters. Afterward it may be a matter for consideration whether its methods are best, or inadvisable for maternity and child welfare work. There is no doubt that in connection with matters like diphtheria immunization they do achieve the object in view.

Speaking generally, our methods of propaganda in public health matters are so respectable indeed that they get us nowhere. For example, we circulate little sober-minded articles in the paper *Better Health*, which is utilized by a few public authorities, and then, as a rule, that circulates only to the converted. Possibly we put up little posters in shop windows, which have got no particular bite and get mixed up with a similar sized advertisement of a "Social Tea at the Local Church Hall."

Of course, Dr. Nash is laying it on a bit thick for emphasis. Both in quantity and quality a fine job of public health education is being done in England. Dr. Nash continues:

We in this country are not so ostentatious in our methods as they are on the other side of the Atlantic, and that may possibly be due to the fact that the populations on the other side are more mixed and contain more of the temperament of middle and southern

Europe, which is more used to flamboyant and jubilant methods of expressing its emotions.

As an example of the way in which things are done in America, where every organization is roped in to assist, I am going to give you an account of a campaign in New York.

. . . In New York, the funds for a certain campaign for diphtheria immunization were found by the Milbank Memorial Fund and the Metropolitan Life Insurance Company.

Then follows a long summary of that campaign, with references to Honolulu and New Haven.

In addition to posters the Americans go in very largely for small pictorial pamphlets dealing with all sorts of activities in the public health work. They also use the schools enormously by circulating puzzles and such like things worded with the slogan they are trying to put across. All this is done on the basic understanding that constant reiteration of any phrase eventually gets into the intelligence somewhere.

Dr. Nash mentioned our use of radio and motion pictures, and spoke enthusiastically of a 16 mm. picture taken in his own clinic, closing with a reminder that

Pictorial publicity, one has got to realize, is expensive if continuous, and it is a matter for very mature consideration whether that amount of money spent on the salary of an efficient health visitor is not going to produce results which are better in the long run. It is only the tactful and efficient health visitor who can, after several refusals, get inside the house and break down the barrier of resistance that is greatest, as a rule, in the houses where the need is most, and I am afraid it is these families which are going to be least influenced by sober-minded pictorial advertisements.

In any advertising display there must be a punch of some kind, but it must be strictly truthful.—

Ways and Means of Propaganda.
Mother and Child, 5, Tavistock Square,
London, W. C. 1. Aug., 1933. *9d.*

An Official Declaration—The Subcommittee of the Committee on Administrative Practice proposed and the American Public Health Association

formally approved at Indianapolis of the following statement of "desirable standard minimum functions" in public health education:

Modern public health practice has shown how to prevent a large proportion of sickness and premature deaths. It is a responsibility of health departments to make this knowledge accessible to the average man, in a form which he can understand and make a part of his living. This may be accomplished through such channels as general newspaper or magazine publicity, the distribution and publication of books and pamphlets dealing with subjects of personal or community health, through lectures, personal and group demonstrations, using lay and professional staffs, through pictures and exhibitions.

State health department functions were declared to include:

Collection, tabulation and publication of vital statistics for each important political or health administration unit of the state and for the state as a whole.

Collection and distribution of information concerning preventable diseases throughout the state.

In *American Public Health Association Year Book*, 1933-1934, pp. 8 and 9.

What Should Be Taught in Junior High Schools—From widely separated states comes news of new efforts to place high school presentation of health upon the highest plane.

We hope that readers will contribute to the study being made by Dr. William P. Brown, Medical Inspection Bureau, State Education Department, Albany, N. Y., whose problem is here stated:

The Division of Health and Physical Education of the State Education Department is reviewing the health program for junior high schools and is expecting to revise the content and methods. It is planned to include in grades 7 to 9 a fundamental understanding of the causes of common diseases and an appreciation of the dangers of self-medication and of delay in treatment. The policy of the Education Department has for some time excluded systematic attention to diseases in the health syllabi for the elementary grades, 1 to 6.

This study will be developed during the

next 12 months and is aimed to increase the far-reaching influence of the high schools in the public practice and understanding of health. Readers of the *American Journal of Public Health* who have in mind items of improvement in this field, or errors to be avoided are invited to send suggestions to Dr. Brown.

What methods and to what scope should the mental hygiene be incorporated, and under what auspices could instruction in family relationships and discipline be included?

Scientific outlines of the preventive principles concerning such prevalent diseases as rickets, typhoid fever, smallpox, diphtheria, tuberculosis, cancer, goiter, syphilis, rheumatism, etc., might be phrased to be of value to the child in the events of post-school life, and could also be of value in parenthood that will follow normally in the next decade for these future citizens.

Suggestions as to textbooks are also desired.

Yellow Fever in New York City—"Yellow Jack" on Broadway suggested to Attention-Caller Zimand that he send us a page from a March, 1930, issue of *Weekly Bulletin*, New York City Health Department.

The *Bulletin* editor, in looking through some old records had noted that

Almost every year from 1795 to 1805 deaths from this disease appear in the records, causing many to flee the city and giving rise to great fear and alarm among the people.

The worst of these epidemics, during 4 months commencing the end of July, 1798, caused nearly 1,500 deaths. At that time the population of the city was approximately 60,000 and the total number of deaths from all causes averages slightly more than 2,000 per annum.

Of 40 physicians listed in the 1785 City Directory, 16 died of yellow fever.

Old records and old newspaper files may yield usable examples to point the moral of progress in public health in almost any community.

Why They Are Not Listed—We aim to list all materials coming from

national sources in the United States and Canada, and materials available generally to health workers in either or both countries.

Sometimes publications or other materials are held up so that we may write for desirable information that has not been given. Frequently we never get the letters written. So please send the information with your materials. When we take a chance we frequently get the "facts" wrong.

We fail to list much of the materials from national sources *especially from national health agencies, both governmental and others, because only a few of them send copies of their new issues and their lists of materials.* That accounts for some nationals never being mentioned, although other nationals frequently get into this department.

"Hygeia," April, 1934—Published at 25 cents a copy, by American Medical Association, 535 North Dearborn St., Chicago, Ill.

Longevity in the United States; What you should know about tuberculosis; The family and the handicapped child; The morning sneezes; Sex education in relation to the family; Committee on Foods and malted milk; Does a contented person snore; Unhooking the hookworm; Discipline through emotional appeal; How, when and why to exercise; Abdominal pain; "Athletic heart"; "Athletics for all"; The charm school; What happens when you see things and when you hear things; "Men in White" (scenes from the play); New books on health; School and health, including Do you make use of your local health agencies, School health effort and community health agencies, A bibliography on solving health education problems, New health books for teachers and pupils.

What Tuberculosis Workers Have Heard—Our attention has just been called to a group of papers on health education which were presented at annual meetings of the National Tuberculosis Association and may be found in the annual volume of *Transactions*.

The figure in a parenthesis after a title indicates the year.

"Moulding Health Opinion and Shaping Health Attitudes," by Wayland J. Hayes (1930)

"How to Conduct a Successful Public Health Meeting," by W. F. Higby (1932)

"The Psychophysics of Health Education," by Iago Galdston (1932)

"The Philosophy of Health Education," by Ira V. Hiscock (1933).

"The Tools of the Health Educator," by Grant Fleming, M.D. (1933)

"The Authenticity of Health Education Materials," by W. W. Bauer, M.D. (1933)

Motives in Health Education—*"You and Your Community"* is treated in the Sept., 1933, issue of *Health Bulletin for Teachers*, Metropolitan Life Insurance Co., New York, N. Y. The introductory paragraphs discuss motives:

Until recently, fear was the motive commonly used in the formal type of hygiene teaching in schools. "Be vaccinated to avoid the danger of smallpox." "Don't spit—it spreads disease." The avoidance of undesirable results is a valid but limited motive and its use has serious drawbacks.

A second motive, and the one which is now dominant in many school programs of health teaching, is the positive appeal to the desire for individual achievement. "Exercise so that you may win athletic competitions." "Drink milk so that you may grow up to be a strong and successful man." This is a valid motive at a certain stage of child development and is a great improvement over the fear motive.

The third motive is the recognition of social responsibility. Membership in a group involves privileges and responsibilities. Together we can attain advantages which we could not gain as individuals. A study of the community health program well illustrates this fact and develops an admirable correlation between hygiene and civics.

Health Education Duties of Physicians—In "Duties of the Profession in Health Education" Dr. W. W. Bauer reviews some misconceptions of doctors and laymen, discusses some "expensive forms of public health work which ought to have been done

by the family," and reviews some "high lights in the field of medical participation in public health work."

Granting that the public is entitled to information about its own health, it seems self-evident that the medical profession is obligated in the public interest to supply such knowledge. So also are health departments and public health leagues, tuberculosis associations and similar voluntary health organizations. In fact, the proper functions of such organizations, as the best of them recognize, should be educational exclusively. In the field of health education, so-called, will also be found commercial organizations of various kinds supplying health information, some of it of the very highest type and some of the very lowest and most reprehensible. How is the layman to discriminate if his doctor does not help him? He is assailed on all sides with health education or what passes for health education. The utmost cunning is exercised by commercial exploiters of the health motif. Public health departments have not always been as scrupulous as might be desired in avoiding tie-ups with commercial exploiters, buying a temporary advantage in publicity at a price which included sacrifice of their own standing as disinterested purveyors of facts.

The doctor's duty is clear. How shall he proceed to discharge it? The first question that is usually raised is that of ethics. It is easy enough to answer. Health education is not advertising in itself. It can be misused so that it constitutes advertising, or it can be kept, as it ought to be kept, education purely. The choice is sufficiently plain. In every corner of this country, the medical profession is taking up, to a greater or lesser extent, the problem of health education.

Posters Prevent Traffic Accidents —So says National Safety Council.

Pittsburgh and Evanston, joint winners of the National Traffic Safety Contest last year, made extensive use of posters and outdoor displays. Nearly every city in the contest which received a high ranking under the "Public Education" item carried a direct safety appeal to the public in the form of posters.

As a compilation of the experience in many cities, the National Safety Council has issued a memo—Public Safety Memo No. 81—on "Using Traffic Posters."

The most common size for traffic posters is 25 x 38 inches. This is large enough for outdoor posting and not too large for use indoors.

A smaller size, 17 x 23 inches, is often used where it may be approached closely enough to be read easily. Occasionally, large multiple-sheet posters for highways billboards are used, but there is no national organization that regularly publishes traffic posters for these big boards.

The memorandum tells where to display the posters, how to get them posted, and how to make the display boards.

The National Safety Council publishes traffic posters regularly. Each month one new two-color poster with the same slogan and design in each of two sizes is issued. In addition, there are published from time to time smaller posters which are suitable for traffic use. Forthcoming posters are illustrated in *Public Safety* the month previous to publication, and in *National Safety News* for the month of issue. Posters are also available from some automobile clubs and insurance companies.—

Address National Safety Council, 20 N. Wacker Drive, Chicago, Ill.

Adults Can Learn—No longer may failures in adult health education be laid to the learning inability of the adult. The basic studies by Edward Lee Thorndike leave no doubts as to possibility of teaching grown-ups.

Dr. Thorndike reports briefly on investigations which are detailed in full in *Fundamentals of Learning*, a Teachers College publication. We quote:

All of the 104 experiments reported in this volume were with adults, with an age range of from 20 to over 50. In these fundamentals of learning we have so far found no differences between the twenties and the forties. As was shown in the report published as the volume "Adult Learning," there is a slow decline in the ability to learn from about 25 on, but there are no observable differences in the nature of the fundamental and general forces which make learning possible. The "Adult Learning" encouraged workers in this field by demonstrating through extensive experiments that their task was possible and hopeful and that their opinions to that effect based on their own experiences in teaching adults were not illusory or prejudiced.

The *Fundamentals of Learning* may encourage them further to expect that no peculiar

pedagogy is necessary in teaching adults. The task of teaching at all age-levels is to put together in the mind what should go together, and to make these connections satisfying. The facts, skills, abilities, etc., which are suitable to be taught to adults often differ from those suitable for children, but the general procedure by which any information, skill or power is developed does not. What will interest and satisfy adults differs, of course, in important ways from what will interest and satisfy children or adolescents, but the general process by which a satisfying after-effect confirms the behavior that produces it does not. The general laws of human modifiability do not change with age. Procedures that are fundamentally sound (or unsound) in learning and teaching at age 10 or 20 will be so at age 30 or 40 or 50.—

Journal of Adult Education, 60 East 42d St., New York, N. Y. Jan., 1934. 75 cents. This is a paper-bound volume of 125 pages. An issue every 3 months. A publication of fascinating interest to those concerned with the thinking and practising in the many fields of adult learning in this country.

In South Africa—"Health publicity and educative work" is a sub-title of the annual report of Dept. of Public Health, Union of South Africa, Pretoria. In addition to the familiar topics for pamphlet or leaflet presentation we find publications on daggo smoking and snake-bite.

The department offers 13 motion pictures, including one on bilharziasis; a set of models loaned for "health weeks" and other events; and lantern slides, with 3 magic-lanterns—all offered to "ensure the coöperation of an enlightened public."

Lead, Not Follow, in Use of New Ideas—Business and industry have advantages over health and social work in larger budgets for writers, artists and printed matter—but they have no monopoly of ideas. Years before business discovered cut-out photographs, silhouettes and sketches, and three-

dimension letters, we were urging their use in exhibits and displays.

Inanimate objects are beginning to talk in advertisements: fine instruments, tooth brushes, light bulbs. How about test tubes, birth records, disease germs, clinic doors . . . ?

"Streamlining" and "wind resistance" are being applied to "strip your . . . of non-essentials . . ."

But as one advertiser says: "a great deal depends upon the skill, ingenuity and imagination with which it is interpreted."

Anyway let's use 'em before they become threadbare.

"Ill-Advised Propaganda"—Under this heading are reports of two addresses at a meeting in London to consider the Final Report of the Departmental Committee on Maternal Mortality and Morbidity.

Dr. Agnes Young, assistant county medical officer, Warwickshire, is

. . . impressed with the detrimental effect of fear of pregnancy upon the expectant mother. She lays considerable blame at the feet of the lay Press for this situation, as she considers that undue prominence is given in the newspapers and other lay periodicals to the question of maternal mortality, and given in such a way as to induce fear rather than confidence. This fear, she considers, must be counteracted. If this dread is dispelled during pregnancy, she says, there is much less chance of an otherwise normal delivery being adversely affected by any psychological factors, for undoubtedly fear can inhibit proper uterine contraction, resulting then in instrumental delivery, and at added risk of infection.—

Mother and Child, London. Apr., 1933.

SOME TITLES

"Infectious Diseases We Don't Talk About"—*Health Bulletin*, N. C. State Board of Health.

"Our Friends the Bacteria"—*Public Health News*, Dept. of Health of New Jersey.

BOOKS AND REPORTS

Pediatric Nursing—By Gladys Sellew, M.A., B.S., R.N. (3rd ed.) Philadelphia: Saunders, 1934. 609 pp. Price, \$2.50.

This well written textbook presents in a clear and interesting form a broad and comprehensive study of pediatric nursing together with as detailed a survey of the physical and mental development of normal children as can logically be included. The book is the result of years of experience in working with children and in teaching pediatric nursing.

In plan it follows closely that of the second edition, but much new material has been added following recent developments in pediatric practice. The questions appended to each chapter are specific and particularly helpful to the student not yet adept at grasping and organizing the important facts in newly presented subject matter. The illustrations included are relevant and instructive but too few in number. It is the reviewer's belief that a good illustration accompanying the description of a procedure is one of the most effective of teaching aids. As an example, note the illustration of three methods of carrying a child given on page 119. The description of the procedure is clearly written, but the illustration can be more quickly and thoroughly comprehended by the average student and will be remembered longer.

Except that the book is already long for the amount of time generally devoted to class work in pediatric nursing, the chapter on occupational and recreational therapy could well be enlarged. The list of reference books upon child guidance and play materials is stimulating and the books suggested for the enjoyment of children them-

selves will prove helpful to those who have little familiarity with the literature of this field. The binding, printing and indexing meet all requirements for textbook use.

The third edition of Miss Sellew's *Pediatric Nursing* is welcome not only as a textbook for the permanent possession of each nursing student, but can be studied with profit and pleasure by any graduate nurse interested in keeping well informed about all lines of medical and nursing progress and by the married nurse who uses her training only for the welfare of her own family and her influence among a small circle of friends.

HAZELLE BAIRD DOUGLAS

Physiological Effects of Radiant Energy—By Henry Laurens, Ph.D. New York: Chemical Catalog Co., 1933. 610 pp. Price, \$6.00.

This book is an American Chemical Society Monograph. It is primarily a source book on the nature, physics, and effects of radiant energy as applied to human physiology. The subject matter is well arranged and the style is clear.

The chapter on the physics of radiant energy is most complete and up-to-date.

By far the largest part of the text is concerned with the effects of ultraviolet radiation upon metabolism, the balance of the book being devoted to the effects upon the skin, the eye, the circulation and the blood, and a chapter on photo-dynamic sensitization, which reviews the various theories held by different observers of this phenomenon.

The final chapter on the mode of action of radiant energy brings out the consensus of prevailing thought on this question and summarizes it very well.

The bibliography is exhaustive, ex-

cupying 15 pages, and has its alphabetical index. A complete list of authors and subjects is also included.

The book as a whole is an excellent review of the work done to date in this particular field. All who approach the subject from a scientific point of view will find it a splendid text, but for the general medical man it is much too technical and theoretical.

It is well set up, quite readable, sturdily bound, withal a very good book.

H. M. HERRING

Blindness and the Blind in the United States—By Harry Best. *New York: Macmillan, 1934.* 714 pp. Price, \$6.50.

This volume is a revision and an expansion of *The Blind: Their Condition and the Work Being Done for Them in the United States*, Macmillan, 1919. With what must have been a prodigious amount of labor, Dr. Best has brought together a wealth of well-documented material and has given us a book which will rank as the standard reference work in its field.

The author emphasizes the fact that the attitude of society toward the blind is too frequently one of compassion only; that concern in the blind based upon their actual position in society and the treatment accorded them is seldom shown. His treatment of the subject is that of the social economist. The blind are regarded as certain components of the population who demand classification and attention in its organization. The problems created by the presence of such a group and the measures taken to adjust the group to society are here carefully set forth. The result is a study, detailed and comprehensive.

The material is arranged in seven parts as follows: Blindness and possibilities of its prevention, General condition of the blind, Provision for the education of blind children, Intellectual

provision for the adult blind, Material provision for the blind, Organizations interested in the blind, Conclusions with respect to work for the blind.

LUCILLE A. GOLDTHWAITE

Health Education in an American City—By Louise Franklin Bache. *Published for The Milbank Memorial Fund. New York: Doubleday, Doran, 1934.* 116 pp. \$2.00.

When Syracuse began its health demonstration in 1923 health education was recognized as a legitimate member of the family and took its place on equal terms with sanitation, engineering and epidemiology. This was an acknowledgment that while we, the sovereign people, will be led, duped, and cajoled, we will not have thrust upon us something that is new unless it is popularly interpreted.

Miss Bache, who directed the health education program, gives us a faithful account of the methods used and the results that followed. Theories and precepts about health education we have had in abundance; reports of excellent but isolated enterprises have inspired us; but this is the first full record of actual work done on so comprehensive a scale. It is the equivalent of an extensive laboratory experiment meticulously reported, and as such serves as a guide to all of us. We glean from it many helpful hints about the use of the newspaper, the radio, the spoken word, and other media of thought-exchange; but what is still more valuable, we learn the importance of carefully planning a publicity project as a whole. Apparently the various publicity media were not indiscriminately "fed" on whatever pabulum happened to be lying around loose but each was selected to serve the particular need of the plan at a particular time.

One lesson the reader will learn is that health education is not an entity

independently pursuing its own purposes but rather the vocal organ of the entire health department. Another is that the art of publicity is neither black magic nor a capricious gift of the gods, but honest toil plus a pinch of inspiration.

H. E. KLEINSCHMIDT

Public Sewerage Systems in Germany—By *Prof. Dr.-Ing. E.h. J. Brix, Dr.-Ing. E.h. Karl Imhof, Prof. Dr. R. Weldert. Jena, Germany: Gustav Fisher, 1934. 2 vol. 298 fig. 1549 pp.*

The work here reviewed represents the completion of a stupendous undertaking. The general principles underlying the design of public sewerage systems and of sewage treatment are given generous space, while figures for water consumption for domestic and industrial uses, the laboratory examination of sewage and sludge, and the discussion of administrative units for the control of sewerage systems and sewage treatment, such as sanitary districts, are presented at length.

Complete descriptions of the sewerage facilities in all of the German cities are given with a degree of detail varying with the size and complexity of the system, but in every instance the sewage treatment plant, pumping stations, the basis for design and the costs, are included.

It is difficult, in a brief review, to do complete justice to the enormous amount of work involved in the preparation of these two volumes. The text supplies a new reference volume which we might well emulate for similar systems in this country.

The books are excellently printed, the paper is of fine quality, the drawings and photographs are carefully reproduced and an obvious and successful effort has been made to provide the reader with easy reference to all of the information.

ABEL WOLMAN

Adolescence—By *Beverly R. Tucker, M.D. Boston: Stratford Co., 1933. 121 pp. Price, \$1.25.*

A book on adolescence is always received with interest, since the subject is important and the literature meager. This particular one is somewhat disappointing. The author has the necessary qualifications to deal adequately with his theme, but too much of the book is given over to brief references to most of the diseases which human beings in the adolescent stage might have (and his limits for adolescence are 9 to 25 years of age). Parents, teachers, boy and girl scout leaders—for whom the book is written—will get an exaggerated impression of the dire things which are likely to befall their children or charges; especially as mouth-filling psychiatric terms are used in all their glory with equivalents in parentheses. Many of the statements are very dogmatic and sweeping, as for instance, "Indoor exercise is rarely beneficial and indoor swimming pools and gymnasiums with their poor ventilation and easy exposure to infection are dangerous." The short chapter on "The Sex Question" is quite inadequate.

It is a pity that the author did not write either a larger book for trained workers or a different type of book with the technical matter largely omitted, its place being taken by an amplification of the hygienic rather than the disease aspects of adolescence.

MERRILL E. CHAMPION

The Foundations of Nutrition—By *Mary Swartz Rose. (rev. ed.) New York: Macmillan, 1933. 674 pp. Price, \$3.00.*

"This book is written for those who wish to live more intelligently." The manner of treatment is based on the writer's experience in teaching nutrition to beginners. There is an interesting historical introduction, followed by the

physiological facts showing the need of the body for energy and the amounts required for adults and for children, as well as the recognized methods of measurements. Various factors causing variation in the basal metabolism of individuals are well discussed. Then follow chapters devoted to calories, to the vitamins, and to the substances from which we obtain our foods. Sound advice on the construction of adequate diets is given not only for adults, but also for preschool, kindergarten, elementary, and high school children. An especially valuable chapter is that on the food needs of mothers and babies. There are 9 valuable appendices giving tables which every student of nutrition needs to consult more or less frequently.

There is an interesting section on the relation of food to diet, a distinction which is so little understood by many people who should know better. The author describes the method of estimating foods according to "shares" and gives figures representing graphically the different values of an orange and a potato, for example, while in Table 1, the value of the foods is given in "shares" of the principal elements as well as the vitamins. The share is based on the average diet for an adult of 3,000 calories, which the author conceives of as being made up of 30 portions, the values of which are given. A share, then, is one-thirtieth of the day's requirements and is given for energy, protein, calcium, phosphorus, iron, and vitamins A, B, and C.

We have called attention to the chapter on food needs for mothers and babies. This begins with a quotation from Arnold Bennett: "The baby owes nothing at all to his parents. . . . The parents owe everything to the baby . . . we are bound to see that children are given the best opportunity to develop to the limit of their growth capacity."

The historical introduction recites an

observation of great significance, dating back to 607 B.C., which emphasizes the old adage that there is nothing new under the sun. Nebuchadnezzar, after capturing Jerusalem, selected a number of youths for training as courtiers, who were to have a special education and a daily portion of the king's meat and wine. One of them objected to this diet, and proposed that they be given a 10-day test during which they were to eat pulse and drink water. At the end of the 10 days they were fairer and fatter than the children who ate the king's meat, so that the steward continued this diet, and at the end of their probation, the king examined them and found that they scored 10 times better mentally than all the magicians and enchanters in his realm.

The book is most interestingly written. The printing and illustrations are excellent. It seems a work of supererogation to recommend a book which is so well known through the first edition and written by the author whose name gives assurance of study and accuracy. MAZÛCK P. RAVENEL

Mystery, Magic, and Medicine—By Howard W. Haggard, M.D. New York: Doubleday, Doran, Inc., 1933. Price \$1.00.

The author of *Devils, Drugs, and Doctors*, and other books, has dedicated this account of "the rise of medicine from superstition to science" to Dr. E. R. Squibb whom he characterizes as "a pioneer in the advancement of scientific medicine."

It is a condensed story of the development of modern medicine with its beginnings in mystery and magic and its steady progress to the present-day status.

The far reaching influences of the fundamental sciences are recognized. The reader is given glimpses of personalities who played an important part in this triumphant march. Photographs of

these men, and documents are additions to the book.

A glossary of proper names and medical terms makes up the last fourth of the book.

The style is interesting—the author presents facts in a very readable, attractive way, and any person will find the book worth while as a brief account of the evolution of medicine.

ANNA DEAN DULANEY

Food, Nutrition and Health—By *E. V. McCollum, Ph.D., Sc.D., and J. Ernestine Becker, M.A., Published by the Authors, East End Post Station, Baltimore, Md., 1933, 146 pp. Price, \$1.50.*

Due to the great demand for this small book which presents the established facts about the relation of nutrition to health in simple, non-technical language, the authors have presented a new and rewritten (third) edition.

In the introductory chapter, the nutritive needs of the body are set forth briefly. Here one can obtain in simple language the answer to "What Constitutes An Adequate Diet?" Chapter III discusses Carbohydrates, an added feature to the previous editions. One who does not possess knowledge of nutrition and who questions the information so widely disseminated by faddists and promoters of special foods will find this book highly instructive. The three chapters on "The Diet and Preventive Dentistry," "The Reducing Diet," and "How to Increase the Weight," are especially recommended.

In keeping with the times, the wisest spending of the money allotted for food in the family budget has been stressed. The last chapter on "A System of Diet Which Promotes Health" gives a few simple principles and a list of menus for the different seasons of the year.

The print is rather fine and there are no illustrations. Home economics teachers, dieticians, health educators,

nurses, social workers, extension workers and others will find this book a valuable and in their teachings of how to live so as to further health.

BESS EXTON

The Century Childhood Library—

Edited by John E. Anderson, Ph.D.

New York: Appleton-Century, 1933.

3 Vols. Price, \$2.50 each.

This library is well named; the three volumes form an excellent library dealing in sufficient detail with the physical and mental aspects of childhood. Parents with this "Five Inch Shelf" to consult and with the intelligence to make proper use of it ought not to go far astray. All three books are for the educated parent; they are a little over the heads of the many who rightly look for guidance to the innumerable pamphlets and leaflets put out by official and unofficial agencies. A brief indication follows of the many good things to be found in these books.

Busy Children, by Josephine C. Foster, Ph.D., is best described by its subtitle "Guidance through Play and Activity." The meaning of play; the selection of toys; play with and without apparatus; games and sports; making things; are discussed in some of the chapters. An important section deals with the child's participation in the family activities and another with education at home and at school. There are others equally interesting and thoughtfully worked out. A summary at the end of each chapter serves a useful purpose.

Happy Childhood, the contribution of the general editor of the series, John E. Anderson, Ph.D., deals with what is usually called child guidance or mental hygiene. It has been said that some books can be read by looking over their table of contents. That is not true of this one; nevertheless, that table does give the reader a pretty good idea of what he will find in the 20 chapters, all

of them good and thought-provoking. The background of the child; his equipment for living; his various "quests" as the author puts it—for security, affection, knowledge, social esteem and so forth and the problems involved. Other chapters have to do with the gifted child and with the handicapped child. There is a valuable chapter on parents and homes; another on self control and discipline. Free use is made of the White House Conference data—the author was chairman of one of the committees of that Conference.

Healthy Childhood, by Harold C. Stuart, M.D., the third volume in the series, is in many ways the most complete book available on the subject of the physical aspects of child hygiene, intended for the use of the layman. The usual phases and some that are less usual, are discussed in ample detail; such as the anatomy and physiology of the child's body with practical applications to child hygiene; the principles of nutrition and their relationship to the feeding problem; rest and activity; infection, immunity, and the prevention and treatment of infectious disease; control of environment; accidents. The last chapter deals with special features of care at different ages. An appendix takes up the more common diseases of childhood. Additional features have to do with the child health movement; preparation for parenthood; and characteristics of growth.

A few points will occur to the public health trained worker about which there might well be a difference of opinion. In the chapter on the child health movement, no mention is made of Josephine Baker's pathfinding work in New York City in 1908 and after. Her bureau of child hygiene, nominally a city affair, was really the source of most that followed in the national field. The impression is given, it seems to me, that the reduction in infant mortality is pretty much due to the efforts of

health workers. I wish that this could be proved: it would be very comforting to some of us who have labored long in the vineyard, but how much of the evidence is based on wishful thinking?

Other minor points come to mind. For example, the use of fuming nitric acid in the treatment of dogbite is usually considered safer practice—based on experimental evidence—than the use of silver nitrate or other cautery referred to in the text. The author goes into too great detail in spots on the subject of quarantine. This is a matter entirely within the province of the health department and the periods given in the book may not agree with those of the department within whose jurisdiction the reader may be. It would be better to give more explanation of official relationship to communicable disease. Finally, the index could be expanded somewhat to advantage. A good point about all three books is that each has an index of its own and a combined index to all three.

Healthy Childhood can be recommended without reservation as a *vade-mecum* for the intelligent and conscientious parent, and to all others as well who are interested in obtaining a sound outline of child hygiene.

MERRILL E. CHAMPION

Windows on Henry Street—By Lillian D. Wald. Boston: Little, Brown, 1934. 348 pp. Price, \$3.00.

This book takes up the thread of Miss Wald's story where her previous book, *The House on Henry Street*, left it in 1915.

The present volume really acquaints one with Lillian D. Wald, yet cannot be classified in the least as an autobiography.

The author has looked out of the "Windows upon Henry Street," and witnessed the changes year by year, has seen the intimate home life of the people of a congested neighborhood,

people with limited chances, pinched lives, and smothered emotions—and she has dared to dream above such stifling, suffocating conditions into a future for a quickened and an awakened social consciousness whereby changes have been made, and in the future to a greater extent will be made, affecting the conditions of and greatly uplifting human life—thus making true a Human Progress in which the new generations will surpass the previous.

In this book one sees the long line of humanity passing into and being changed by the light that shines through those "Windows on Henry Street"—the sick, the widowed, the aged, the young, mothers, fathers, children, the mental defective, the wage earner, the poorly housed, the poorly clothed, the bigoted, the spiritually crushed—and then sees them emerge filled with hope,

faith, and courage, to press hopefully back against their problems and as they go on into life to spread the message of cheer so that it passes around the world touching untold lives bordering upon its pathway.

Those selfsame "Windows on Henry Street" have also let one glimpse into the very heart and soul of the woman who has played the chief rôle behind them—the real Lillian D. Wald stands revealed.

The message of the book is—"we have found that the problems of one set of people are essentially the problems of all. We have found that the things which make men alike are finer and stronger than the things which make them different—that people rise and fall together, that no one group or nation dare be an economic or social law unto itself." CHARLES HAMMOND

REPORTS

Julius Rosenwald Fund—In the 2-year review for 1931–1933, the President of the Fund pays fitting tribute to the founder and outlines the varied interests in which the Fund participates. Planning of Indian education, coöperation in Negro welfare work, studies of education in American Samoa and in the Dutch East Indies, are among the activities discussed. Objectives of education in various cultures are analyzed. The Fund's attention is given to these problems because of concern for racial adjustments in this country and the world over and because of its interest in the general subject of education.

The Division of Medical Services is carrying on a program which includes a general information service on the economic aspects of medical care and service, studies and appraisals of plans

and experiments in group practice and group payment, and consultant service and professional aid.

New Jersey—The year ending June 30, 1933, was marked in New Jersey by the application of a new milk control law, by enlargement of the laboratories and other quarters of the State Department of Health, and by enactment of other public health laws for future enforcement. The new milk act made necessary, following inspection by a New Jersey public health official, the approval if indicated of every dairy and milk plant from which milk and cream to be used in fluid state is shipped into New Jersey. Included in this group were some 35,700 dairy farms and 319 milk plants located in the states of New York, Pennsylvania, Delaware, and Maryland. The use of

temporary permits became necessary in view of the magnitude of this task.

Approval was given by the Department for reclassification of water purification and sewage disposal plants for purposes of licensing operators and the adoption of definite qualifications, based on training and experience to be met by applicants for licenses. Also, minimum standards of sanitation were adopted for roadside stands, restaurants, soda fountains, lunch rooms, and similar places.

Hamilton, Ontario—A comprehensive health survey report of 72 pages describes the health organizations and relationships in Hamilton, Ontario, and offers carefully framed recommendations for continued progress. The record shows marked achievement in health activities in this city of 155,547 population, indicating a rating of over 85 per cent on the *City Health Appraisal Form*. The report, however, emphasizes the importance of trained personnel and of closely coördinated activities.

Among major recommendations are the following of special interest to health administrators:

3. That the Health Division of the Hamilton Council of Social Agencies be asked to act as a Health Council for Hamilton.

4. That the health services of the Board of Education and the Babies' Dispensary Guild be transferred to the Department of Health, and the staffs absorbed into the Department.

6. That the Department of Health recognize the family physician as the most desirable agent for health supervision.

7. That, for purposes of health administration, the city be divided into four or five sanitary areas, with a health centre in each area.

The surveyors point out the existence of a need for a clear-cut decision as to which department of municipal government or voluntary agency is to be responsible for certain matters. They indicate their belief that all relief by

public departments should be provided through the Welfare Commission of the city. Under this heading should be included: extra nutrition, including milk, and eye-glasses. They also recommend that all nursing service in the home be provided by the Department of Health or the Visiting Nurse Association.

Milbank Memorial Fund—The belief is expressed in the 28th year review that public health, as a social function, is concerned not only with direct measures for the prevention of disease and the education of the public in hygiene, but also with the medical care of the sick, the proper administration of relief, and with the prevention of all conditions that are harmful to health, whether they be economic, social, or more directly etiological. If the vitality of the population is to be preserved, according to the Fund's observations, public health and medicine of the future will be concerned with the health of adults as well as that of infants and children, with controlled fertility, and with further modification of harmful conditions of environment. Integration of services in more comprehensive, better planned programs that are more than local in scope is an expressed need.

Referring to the health demonstrations, it is noted that many services developed within the Bellevue-Yorkville area on an experimental basis have been extended to other parts of the metropolitan district. Further, the policy of district health administration through health centers has been adopted and a program of district or decentralized health administration has been undertaken. Studies of how existing public health procedures can be made more effective through increased efficiency of personnel and by more careful selection of individuals who are in greatest need of services are reviewed. The varied

interests of the Fund are suggested by a description of health projects carried on in Ting Hsien, China, under the auspices of the Chinese National Association of the Mass Education Movement. Reference is also made to a recent study of public health conditions in Russia under Fund auspices, and to the publication of the results in the 5th volume of the series of international studies on medical and public health procedures.

U. S. Public Health Service—In a compact volume of 128 pages, the Surgeon General's report of the Public Health Service for the 62nd year reviews world health conditions and describes how the duties of this important branch of federal government have been carried out. Generally good health conditions in most of the countries are noted for the year 1932. Extracts from the report follow:

In 1932, about 75,000 cases of cholera were reported throughout the world, with 39,000 deaths. In 1931, 260,000 cases and 141,000 deaths were reported. Most of the recorded cases occurred in India. In the Philippine Islands 420 cases of cholera were reported during the calendar year 1932, as compared with 936 cases in 1931.

In the United States and in England smallpox was less prevalent in 1932 than it was in 1931, but in British India this disease caused 26,900 deaths in 1932 and 19,000 deaths in 1931.

Plague was widespread throughout the world in 1932. Wherever commerce goes rats are carried, and some of these rats carry plague-infected fleas. Typhus fever, another disease of widespread occurrence, is reported from all of the great divisions of the world. In Mexico typhus fever caused more than 1,000 deaths in 1932 and nearly 1,500 deaths in 1931. In the United States most of the cases of typhus fever are of the mild form, but in many countries where the disease is spread by body lice it is comparatively severe. Yellow fever was reported in several provinces of Brazil during the calendar year 1932 and in several countries in Africa, including French West Africa, Portuguese Guinea, the Gold Coast, and Nigeria. The

numbers of cases reported were not large, but the infection exists in large areas.

During the calendar year 1932 and the first half of the year 1933 health conditions were good in the United States as compared with those of preceding years. The general death rate for the year 1932 was the lowest ever recorded. Infant mortality and the death rates for tuberculosis, diphtheria, and typhoid fever also reached new low records. There were no unusual widespread epidemics, and the principal increases in the death rates over rates for preceding years were for cancer, heart disease, and other so-called "degenerative diseases," the death rates of which have been increasing for years.

During the fiscal year no instance occurred of the importation into the United States or its dependencies of any quarantinable disease. One vessel arrived at the New Orleans quarantine station infected with typhus fever; 1 case of smallpox developed among passengers undergoing quarantine detention at the San Francisco quarantine station; 1 vessel arrived at Honolulu after having had 1 death from cholera on board; and 1 vessel with 2 cases of cholera arrived at the port of Manila. In each instance effective measures were taken at the respective stations to prevent the introduction of these diseases into United States territory.

At domestic ports, 398,574 alien passengers and 805,028 alien seamen were examined by medical officers of the Public Health Service under the immigration laws. Of this number 13,942 passengers and 991 seamen were certified for various diseases and disabilities. The most important causes of certification of alien passengers were as follows: trachoma, 252; tuberculosis, 139; feeble-mindedness, 91; insanity, 72; syphilis, 220; and gonorrhea, 345. Of the alien seamen examined 4 were certified for trachoma; 13 for tuberculosis; 67 for syphilis; 83 for chancroid; and 162 for gonorrhea.

In coöperation with State health agencies, 95 per cent of the 2,214 sources of drinking water used by railroads and bus lines, 97 per cent of the 253 sources used by vessels, and 97 per cent of the 116 sources used by airplane carriers were inspected and controlled by the Public Health Service. Municipal health agencies coöperated in this work by collecting and examining approximately 5,000 samples of drinking water taken from common carriers.

In an effort to determine the effect of the depression upon health, information was collected on sickness and mortality in a group of unemployed families. A 4-year family in-

come history and a 3-month illness record were obtained by canvass of about 1,000 families in each of 10 communities located in 8 large cities and 2 more or less rural places. Preliminary analysis indicates higher sickness rates among the poor, particularly in the case of the more serious illnesses that caused inability to work or that confined the patient to bed. It also appears that those families who were moderately comfortable in 1929 but who had been in poor circumstances for 2 to 3 years had more sickness than those who had only recently become unemployed and poor.

New problems in the field of public health are constantly arising. As recent examples may be mentioned the outbreak of epidemic encephalitis in St. Louis, the identification of Rocky Mountain spotted fever of the eastern type, along the Atlantic seaboard of the United States, and the recognition of parrot fever, or psittacosis, as an endemic disease among birds of the parrot family in certain sections of the Pacific coast. Constant efforts are required for the detection and prevention of new dangers to the public health that arise from time to time.

One of the most important functions of the federal government in connection with public health is the conduct of scientific investigations for the purpose of devising new methods for preventing disease and ascertaining the importance and extent of new problems as they arise.

Boston Health Units—The fascinating story of the development of a chain of 7 Health Units in Boston, 1924–1933, is told in a compact volume of 71 pages, beautifully illustrated by many pictures, graphs, and floor plans. In carefully prepared text, Dr. Charles F. Wilinsky, whose association with the Health Unit movement from its inception is well known, traces this movement and indicates its significance to Boston.

The advantages of bringing health services to the doors of the community were significant. The need for coördinating and interrelating services was self-evident, and out of this philosophy evolved the real health center movement, which is about *two decades* old.

It would appear that the health needs of congested areas and improvement in general health can be best met by the decentralization of health work, by the interrelationship of essential activities, the mutual sharings of responsibilities, and the making available, in most convenient and accessible form, of sound health programs. This cannot help but result in furthering general health improvement and in the material reduction of illness. In the extension of this development the medical profession must, and we hope will, play a leading part.

BOOKS RECEIVED

THE THEORY OF PLAY. By Elmer D. Mitchell and Bernard S. Mason. New York: Barnes, 1934. 547 pp. Price, \$2.80.

WINDOWS ON HENRY STREET. By Lillian D. Wald. Boston: Little Brown, 1934. 348 pp. Price, \$3.00.

HEALTH WORKBOOK. FOR COLLEGE FRESHMAN. By Kathleen Wilkinson Wootten. Milledgeville, Ga.: Author, 1934. 214 pp.

BERGEY'S MANUAL OF DETERMINATIVE BACTERIOLOGY. 4th ed. By David H. Bergey.

Baltimore: Williams & Wilkins, 1934. 664 pp. Price, \$6.00.

THE PRINCIPLES OF HEATING AND VENTILATION. By H. M. Vernon. New York: Longmans Green, 1934. 232 pp. Price, \$5.00.

MENTAL HYGIENE OF THE SCHOOL CHILD. By Percival M. Symonds. New York: Macmillan, 1934. 321 pp. Price, \$1.50.

GRUNDZÜGE DER HYGIENE. By Max Euglin. Berlin: Urban & Schwarzenberg, 1934. 448 pp. Price, RM 11.80.

A SELECTED PUBLIC HEALTH BIBLIOGRAPHY WITH ANNOTATIONS

Cancer Increase Stopped?—Study of the cancer death records in Massachusetts from 1900 to 1932 shows that the trend of mortality in that state is changing with the curve flattening and a slight decrease occurring among females. The authors believe the improvement is due to the drive against cancer, the changes in composition of the foreign population, and to the possibility that the saturation point is being reached.

BIGELOW, G. H., and LOMBARD, H. L. Change in the Massachusetts Cancer Trend. *New York State J. Med.* 210, 10:526 (Mar. 8), 1934.

Caring for Handicapped Children—The child handicapped by defects of hearing, vision, speech, and body should be given special consideration in any acceptable public program of health and education.

CARTER, M. M. The Handicapped Child. *Pub. Health Nurs.* 26, 3:123 (Mar.), 1934.

Progress (?) in Health Examinations—In a group of 8,758 families surveyed, about 2 per cent of the population over 20 years of age had a "health" examination during the twelve-month period, and less than 4 per cent had a medical examination of any kind. More women than men submitted to examination and the majority of both sexes were among the better-to-do. Twice as many of those who were sick 3 or more times during the period had a so-called "health" examination as of those who had not been ill. The author concludes:

It may be said that at present the "annual health examination" exists more in theory than in fact.

COLLINS, S. D. Frequency of Health Examination in 9,000 Families, Based on Nation-Wide Periodic Canvasses 1928-1931. *Pub. Health Rep.* 49, 10:321 (Mar. 9), 1934.

Ultimate Life Expectancy—The expectation of life for white males in the original registration area having increased from 48 in 1900 to 59 in 1930, with females showing a 3-year advantage along the line, by a most interesting process of reasoning the authors construct a hypothetical ultimate expectation of life. At birth it will be 69.6 years.

DUBLIN, L. I., and LOTKA, A. J. The History of Longevity in the United States. *Population*, 1, 2:15 (Feb.), 1934.

What Alaskan Natives Die of—More than a third of all native Indian and Eskimo deaths in Alaska are due to tuberculosis. Poor economic and hygienic conditions, ignorance, superstition, and transport difficulties tend to make tuberculosis eradication difficult, tedious, and expensive.

FELLOWS, F. S. Mortality in the Native Races of the Territory of Alaska with Special Reference to Tuberculosis. *Pub. Health Rep.* 49, 9:289 (Mar. 2), 1934.

A Sound Tooth Doesn't Decay—Convincingly summarized here is our present-day knowledge of the rôle of nutrition in building and preserving teeth free from caries.

GARLAND, J. Dental Health: A Problem in Nutrition. *New Eng. J. Med.* 210, 11:563 (Mar. 15), 1934.

Persuading Under-Weights to Eat—

It appears that gaining depends not on the selection of the diet, the preparation of the food, or particularly on the use of high calorie foods, but rather on the creation of the mind to eat.

The devices successfully used to persuade boys to eat up to 5,000 calories of food are discussed.

HORAN, T. N. Diet Table in a Private Boarding School of 200 Boys. *J.A.M.A.* 102, 11:836 (Mar. 17), 1934.

Manitoba's Maternal Mortality—A 5-year survey of 364 maternal deaths revealed findings similar to those from other American communities: abortions contributed nearly a fifth of the deaths; operative interference and faulty technics, as usual, increased the risk. Deaths from liver and kidney complications occur most frequently (and should be preventable). Sepsis, next in importance, also caused more than a quarter of all deaths.

JACKSON, F. W., *et al.* A Five-Year Survey of Maternal Mortality in Manitoba, 1928-1932. *Canad. Pub. Health J.* 25, 3:103 (Mar.), 1934.

Canadian Municipal Health Expenditures—Showing in table form the per capita expenditures for health administration in 16 cities, and dividing into percentages of the total the amounts spent for the various services, the study reveals many interesting comparisons.

JENKINS, R. B. Municipal Health Expenditures in Canada. *Canad. Pub. Health J.* 25, 3:120 (Mar.), 1934.

Milk Bottle Tops—Incredible as it may seem, 2 caps on a milk bottle keep out more contamination than 1 cap.

McFARLANE, V. H., and WEINZIRL, J. The Protective Value of the Single and the Double Cap for Bottled Milk. *Am. J. Hyg.* 19, 2:521 (Mar.), 1934.

Food Handlers and Dysentery—*Endamoeba histolytica* cultures smeared on fingers in excess of any amount with which even the most careless carrier would likely contaminate them, failed to survive drying by more than 10 minutes. This seems to invalidate the suggestion that most infections are spread through direct transfer from hands to food.

SPECTOR, B. K., and BUKY, F. Viability of *Endamoeba Histolytica* and *Endamoeba Coli*. *Pub. Health Rep.* 49, 12:379 (Mar. 23), 1934.

Relationship of Brucelliasis and Undulant Fever—To control and eradicate undulant fever in man, brucelliasis must first be eradicated in domestic animals: so concludes this paper.

STARR, L. E. Undulant Fever. *J.A.M.A.* 102, 12:902 (Mar. 24), 1934.

Toxoid and Toxin-Antitoxin—Toxoid with alum was more effective than without it, and both (in 2 doses of 1 c.c. given 1 week apart) were more effective than the conventional toxin-antitoxin in the hands of these research workers.

WHITE, J. C., and SCHLAGETER, E. A. Diphtheria Toxoid. *J.A.M.A.* 102, 12:915 (Mar. 24), 1934.

Tobacco and Alcohol—Neither the use of, nor the abstinence from, tobacco or alcohol plays an important rôle in the genesis of angina pectoris. In occasional cases, tobacco apparently aggravates attacks; in a few others, alcohol seems to prevent or relieve attacks.

WHITE, P. D., and SHARBER, T. Tobacco, Alcohol and Angina Pectoris. *J.A.M.A.* 102, 9:655 (Mar.), 1934.

Why Public Health Nursing Succeeds—Public health nursing services have been improved and extended to more and more of those who are in need of them, while other health services have been curtailed and emasculated. The reasons why are illuminating. This is 1 of 4 stimulating papers that go to make up an informal symposium on social medicine.

WINSLOW, C.-E. A. Nurses Show the Way. *Survey Graphic.* 23, 4:156 (Apr.), 1934.

EDITORIAL SECTION

Expressions of opinion and statements of supposed facts are published on authority of the writer under whose name they appear, and are not to be regarded as expressing the views of the American Public Health Association, unless such statements or opinions have been adapted by vote of the Association.

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PUBLIC HEALTH WITH THE CIVILIAN CONSERVATION CORPS WORK CAMPS

A GREAT deal has been written in the daily press and in various journals published in this country in regard to the many social advantages accruing from the Civilian Conservation Corps project, but little has been said in regard to its influence upon public health.

By the time this project has faded away into the limbo of past deeds, nearly one million young men throughout the country will have been enrolled in this work for varied lengths of time, averaging 6 months for each. What has happened to them?

In the first place, before enrollment, they were given a simple physical examination, which showed them, particularly, the great necessity of caring for their bodily ills. They were then sent to work camps throughout the country to live and labor for a 6-months period. As these camps were established by the Army, they all had a family resemblance. This resemblance was particularly noted in the preparation and care of food, establishment of proper latrines and baths, provision of a safe water supply, and proper housing and recreation.

Before going further, attention is called to the fact that most of these young men came from a class in society which, in many cases, due to financial reasons, living conditions were not up to the standard which is considered proper for people of this day and age, and a great many of the requirements covering living conditions were very new to the enrollee.

The food provided was of the same standard furnished the Army and the variety allowed by Army ration tables was required. Great care in the selection and training of cooks was exercised; ample bathing facilities with compulsory bathing was the rule; latrines were built fulfilling the most approved sanitary requirements and cleanliness in these latrines was kept at the highest point. All water supplies were checked by laboratory examination and where necessary they were chlorinated or otherwise purified. The barracks were required to be kept clean, and ample ventilation was provided.

In some localities, Civilian Conservation Corps camps were exposed to malarial infection. In addition to limiting the number of cases occurring among these men, careful studies of malaria prevention have been made and anti-malarial work of considerable magnitude has been conducted. The final eradication of malaria is, of course, a utopian dream, but everything that can be done toward the advance in the knowledge of this disease and its prevention is of great value, and it is believed that the information obtained by the study at these camps has advanced the knowledge of malaria prevention and control. Disease conditions of all kinds have also naturally received close attention, and it is not believed that any concentration of men doing work of this character has received as much care and attention from a medical standpoint as has been bestowed upon the Civilian Conservation Corps.

Will this affect the future lives of these young men? This is considered a certainty. Youths of this age are both curious and imitative. They are curious to find out why various precautions are taken, and they are so imitative, that when they return to their homes, they will desire to put into effect what they have learned in regard to hygiene and sanitation. How do we know this?

You have only to visit hundreds of towns, villages and hamlets in this country, and by investigation find that the most active proponents of improvements of hygiene and sanitation in the community are frequently ex-soldiers. Though the Civilian Conservation Corps enrollee is not a soldier in any sense and is not treated as a soldier, the hygienic precautions instituted in these camps are essentially those used in Army service and the effect on the individual is about the same. Is this project of value to the public health of the country? Undoubtedly so, and the results from that standpoint alone will be incalculable.

MEDICAL SENSATIONALISM IN THE PRESS

UNDER this heading is an eminently sound and much needed editorial.¹ It was elicited by the misquotation of Dr. James Ewing, than whom there exists no more eminent authority on cancer in the United States. He was quoted as saying that the idea of discovering a cure for cancer is absurd, whereas his point was that a single cure for all types of cancers would never be found. He also spoke of the exposure of the skin to wind and to sunlight as a cause of cancer if carried to excess. His statement was used as a sensational attack on nudism! Of course Dr. Ewing made a protest, and on account of his position, was able to get it published.

Any careful reader can bring many instances of where scientific facts are changed to sensational misstatements. For example, a few years ago there appeared a statement, "Cure for typhoid found in sewage." The abstract of the article which followed was by one of our leading bacteriologists who had reported the finding in sewage of bacteriophage which was active against strains of typhoid.

Dr. Ewing properly says that such false reports unsettle the minds of the public and fill sufferers with doubt and with fear. The writer of the editorial suggests that if every piece of medical sensationalism and yellow medical journalism brought a storm of criticism from the doctors of the community, reporters and editors would be more careful in what they wrote and published. This may be true, but our own experience leads us to doubt it. The success of certain authors who have written popular books in a sensational manner on medical

subjects is our reason for the doubt. However, we are not trying to discourage the idea of showing up such misleading journalism. We have found repeatedly that even where carefully typewritten statements on medical subjects are given to newspapers, many of them persist in making of them what they call a "story." There is no doubt that they like to be sensational, and many of them have a perverted idea of what makes real news. Even journals published as laboratory practice by schools of journalism do this.

On the other hand, we owe much to the press for spreading information concerning new discoveries in medicine and the results which are responsible for the tremendous prolongation of life and the great lessening of contagious diseases.

REFERENCE

1. *New York State J. Med.*, 34, 1:25 (Jan. 1), 1934.

TOWARD MORBIDITY REPORTING

GOOD public health work rests upon good practice of medicine rather more than upon any of the other collaborating professions, arts and sciences.

Accuracy and clarity of diagnosis are essential to any thorough comprehension of the amount and variety of disease entities and symptom complexes which affect mankind. One influence of great power in raising the level of medical thinking, and making comparable the results of clinical observations of physicians with widely differing experiences, is the adoption of a national nomenclature of disease. Such systems of names of diseases and conditions are in use in the Krankenkassen services of Austria and Germany, and, as recently revised, by the Royal College of Physicians in England.

For the United States we have the *Standard Classified Nomenclature of Disease* which is already influencing the teaching and recording of medical and surgical conditions throughout the United States.

One hundred and eleven of the most influential hospitals are using it exclusively, and these include the teaching hospitals at Harvard, Yale, Cornell, University of Pennsylvania, Western Reserve, Rush, Nebraska University, Stanford University, Vanderbilt University, and Tulane medical schools. In some 300 other hospitals this scientifically constructed, all inclusive system of listing diseases or pathological conditions by anatomical site and etiology is in use. These include hospitals for mental disease, tuberculosis hospitals, and one of the great hospitals for communicable diseases, the Herman Kiefer Hospital of Detroit.

Health officers, registrars and other vital statisticians have a large stake in the extension of accurate knowledge of the prevalence of disease of all kinds, which can come about only when there is a uniformity in the naming of sicknesses equivalent to that of the *International List* in describing the causes of death.

Opposite each of the thousands of names of disease conditions in the *Standard Nomenclature* is the number of the cause of death according to the *International List* under which the registration would be made if the patient died. Thus we have the structural provision for case mortality rates according to the list of death causes now universally used by modern nations.

A second edition of the little pocket volume *A Standard Nomenclature of Disease* is already needed and is in preparation. Administrators of health services should feel it an obligation to see that in all listing of disease, whether preventable or not yet known to be so, the standard nomenclature be in effect in clinics, hospitals and sanatoria under their direction.

ASSOCIATION NEWS

SIXTY-THIRD ANNUAL MEETING

PASADENA LOCAL COMMITTEE

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Louise Dimmitt, *General Secretary*

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Dr. J. Rollin French, President, Western Hospital Association, Los Angeles
Dr. L. L. Henninger, President, Pasadena Branch, Los Angeles County Medical Society
C. C. Hine, Chairman, Health and Sanitation Committee, Los Angeles Chamber of Commerce
Roger Jessup, County Supervisor, Los Angeles County
Dr. Carroll W. Jones, Los Angeles County Dental Society
Dr. Sven Lokrantz, Director of Health, Los Angeles City Schools
Dr. Edward M. Pallette, California State Board of Health
Dr. George Parrish, Los Angeles City Health Officer
Dr. J. L. Pomeroy, County Health Officer, Los Angeles County
Dr. F. M. Pottenger, Past-President, American College of Physicians
Dr. W. B. Wells, Commissioner of Health, County and City of Riverside

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MEETING ROOMS COMMITTEE

Chairman: Ernest Tew, Chief Inspector, Pasadena Health Department

LADIES ENTERTAINMENT COMMITTEE

Chairman: Mrs. Philip Schuyler Doane, President, Women's Auxiliary, California State Medical Society

PUBLICITY COMMITTEE

Chairman: Mrs. Alma Overholt, Publicity Manager, Catalina Island Company

REGISTRATION AND INFORMATION COMMITTEE

Chairman: Robert H. Snyder, Manager Convention and Publicity Department, Pasadena Chamber of Commerce

INSPECTION TRIPS COMMITTEE

Chairman: Walter S. Mangold, Chief, Division of Sanitary Instruction, Los Angeles County Health Department

NEW YORK, CHICAGO AND ALL POINTS WEST! ALL ABOARD!

SO you are going to Pasadena to attend the Sixty-third Annual Meeting! Are you also planning to accept the invitation presented by the Northern California Public Health Association and visit San Francisco, Stockton, and Sacramento afterwards?

To make it easy and inexpensive for you to do both, the Association is sponsoring an all-expense, conducted

tour, so planned as to permit members from almost every section of the country to join it at a convenient point. A preliminary announcement of the tour was made to the membership some weeks ago, and the response was enthusiastic. An illustrated, day-by-day itinerary is in preparation, which will be mailed early in May. Train schedules are included, complete costs

of the tour from many points, and as full a description as it is possible to give of what you will do and what you will see and how you will be entertained if you join the group.

Remember that the dates of the Annual Meeting are September 3-6. Late August and early September make an ideal vacation period; the all-expense tour will cost you less, and you will receive infinitely more for your money than if you traveled alone and made your own arrangements. Remember, too, that your family and friends may come. Let the tour and the Annual Meeting constitute your vacation for this year. Watch for the printed announcement, and make your plans to climb aboard the A.P.H.A. Special at the proper time.

PASADENA ANNUAL MEETING PROGRAM

APRIL 1 was the date set by the Program Committee for the receipt of preliminary Section programs for the Pasadena sessions. Though the material is still tentative in form, it can be announced that it is impressive.

Here is a figurative handful from the program bag:

A dinner under the auspices of the Committee on Professional Education.

The Monday evening General Session at which Dr. Haven Emerson will present his Presidential address.

A public meeting Tuesday evening under the auspices of the Western Branch.

The Annual Banquet on Wednesday evening. Dr. F. W. O'Connor has been invited to present the leading address.

A session of the Health Officers Section on "Serving the Public for Health," with Dr. Henry F. Vaughan and Dr. J. L. Pomeroy as the principal speakers.

A luncheon session devoted to papers and discussions on diphtheria.

A symposium on amebic dysentery. Symposia on Health Hazards in the

Oil Industries, in the Smelting and Refining Industries; Typhoid Outbreak in Southern California; Dairy and Milk Products; Selling Health Department Members First on Health Education; Food Products; Water and Sewage; Diagnostic Procedures and Reagents; Health Education in Schools and the Community at Large; The Part of the Public Health Nurse in the Epidemiology of Syphilis, etc.

FROM 450 SEVENTH AVENUE TO 50 WEST 50TH STREET

RECENT letters from Association headquarters carry a new address—50 West 50th Street—some of the discerning perhaps have noticed. The cover of the April *Journal* records it for the first time.

The organizations in the National Health Council, of which the American Public Health Association is one, were housed for ten years at 370 Seventh Avenue. This address became universally familiar as national health headquarters. In 1931 they moved to 450 Seventh Avenue, and now they are all together at 50 West 50th Street, which is one of the buildings in the extensive development known as Radio City or Rockefeller Center.

The Association extends a warm invitation to all members visiting New York to call at the new offices.

CLOSING DATE FOR ACCEPTING APPLICATIONS FOR FELLOWSHIP

ACTIVE members who wish to make application for Fellowship in the American Public Health Association, are hereby notified that their applications must be submitted to the Committee on Fellowship and Membership not later than July 1, 1934, if final action is to be taken by the Governing Council at the Pasadena Annual Meeting in September.

For the benefit of the newer members of the Association, the two pre-

requisites for applying for Fellowship are repeated here. These are (1) the applicant must have been an active member of the A.P.H.A. for at least 2 years, and (2) he or she must be at least

30 years of age. The professional qualifications which are essential are given in the By-laws, which appear on page 13 in the *Year Book* issued as a supplement to the February *Journal*.

NEW MEMBERS

The following list includes applicants who have been approved for membership in the A.P.H.A. by the Sub-Committee on Eligibility. These new members have requested affiliation with the sections indicated, and action by the Section Councils will follow.

Health Officers Section

James W. Barkley, M.D., Belzoni, Miss., County Health Officer
 Ralph E. Brodie, M.D., 1 East Park St., Albion, N. Y., Health Officer
 T. O. Coppedge, M.D., Nashville, N. C., Nash County Health Officer
 L. Edward Cotter, M.D., Red Hook, N. Y. (Assoc.)
 Gilbert D. Forbes, M.D., Kendall, N. Y., Health Officer
 Ulysse Forget, M.D., 15 Miller St., Warren, R. I., Health Officer
 Harry H. Griffith, Conemaugh, Pa., Health Officer
 Thomas B. Joyce, M.D., 925 First St., Peekskill, N. Y., Taking Extension course for Health Officers, Grade II.
 Andrew J. Krog, Board of Health, Plainfield, N. J., Health Officer
 Elroy F. McIntyre, M.D., Santa Fe, N. M., City and County Health Officer
 Ray E. Persons, M.D., Cairo, N. Y., Health Officer
 Ralph S. Pickett, M.D., Olcott, N. Y., Health Officer, Town of Newfane
 Harry S. Rosenberg, M.D., Franklin Square, L. I., N. Y., Health Officer, South Floral Park
 George H. Schenck, M.D., Southampton, N. Y., Health Officer
 Isidore Schnap, M.D., Box A, Kings Park, N. Y., Taking Extension course for Health Officers, Grade II.
 Richard O'B. Shea, M.D., Welfare Bldg., Bridgeport, Conn., Health Officer
 Stanley A. Stealy, M.D., Box 307, Grayling, Mich., Four County District Health Director
 James B. Vaughn, M.D., Castlewood, S. D., Superintendent, Hamlin County Board of Health
 Raymond A. Vonderlehr, M.D., U. S. Public

Health Service, Washington, D. C., Passed Assistant Surgeon, Division of Venereal Diseases

Laboratory Section

Charles F. Craig, M.D., School of Medicine, Tulane University, New Orleans, La., Professor of Tropical Medicine; Head, Department of Tropical Medicine
 Jessie E. Dow, 503 Hudson Ave., Albany, N. Y., Senior Bacteriologist, State Dept. of Health
 Malvina M. Grieves, R.N., City Hospital, Jamestown, N. Y., Science Instructor, School of Nursing
 Rexford Hansen, 1450 W. Marquette Rd., Chicago, Ill., Director of Clinical Laboratory
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Jessie E. Stickel, Univ. of California Hospital, San Francisco, Calif., Bacteriologist

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Vital Statistics Section

Alice I. Alford, B.A., 505 N. Carroll St., Madison, Wis., Secretary to Director of Vital Statistics, State Board of Health

A. Glenn Evans, 189 Dwight St., New Haven, Conn., taking course for C.P.H. degree (Assoc.)

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Bettie C. Freeman, Sc.D., Dalhousie Univ., Halifax, N. S., Canada, Statistical Assistant, Dept. of Preventive Medicine

Maurice L. Goldstein, Met. Life Ins. Co., 1 Madison Ave., New York, N. Y., Manager, Tabulation Section, Statistical Bureau

Eva W. Ramsey, 130 Capitol Bldg., Salt Lake City, Utah, Deputy State Registrar of Vital Statistics

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Public Health Engineering Section

James D. Caldwell, Health Dept., Murfreesboro, Tenn., Sanitary Officer, Rutherford County Health Dept.

Anselmo F. Dappert, State Dept. of Health, Albany, N. Y., Principal Sanitary Engineer

Nelson Hall, Saginaw County Health Unit, Saginaw, Mich., Sanitary Inspector

Albert I. Howd, State Dept. of Health, Albany, N. Y., Sanitary Engineer

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Samuel B. Morris, 319 City Hall, Pasadena, Calif., Chief Engineer, City Water Dept.

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John P. Boroszewski, M.D., 351 Abbott Rd., Buffalo, N. Y., Medical Director, National Aniline and Chemical Co.

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Food and Nutrition Section

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Culver S. Ladd, B.S., Box 653, Bismarck, N. D., State Food Commissioner

Leicester Patton, B.S., 623 City-County Bldg., Pittsburgh, Pa., Superintendent, Bureau of Food Inspection, Dept. of Health

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Child Hygiene Section

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Public Health Education Section

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Mrs. Charles W. Pollard, 301 S. Happy Hollow Blvd., Omaha, Nebr. (Assoc.)

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Epidemiology Section

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Lynn Dodge, M.D., 11 Pleasant St., Fairport, N. Y. (Assoc.)

Anne P. Schumacher, B.A., 235 E. 12 St., New York, N. Y., Instructor in Public Health, Hunter College

Public Health Nursing Section

Vera Klingman, R.N., 11 S. First East, Logan, Utah, Health Supervisor, City Schools
Katherine Rickan, R.N., 5219 Drexel Ave., Chicago, Ill., Supervising Field Nurse

Associate Member requesting Active Membership

Paul R. Burroughs, M.D., Director of Health, Santa Monica City Schools

NEWS FROM THE FIELD

SUMMER SCHOOL COURSES IN PUBLIC HEALTH

While the following list does not show all universities and technical schools offering summer courses in public health, it represents those who have replied to a questionnaire sent out by the American Public Health Association.

American National Red Cross

Courses in Teacher Training for Home Hygiene Instructors:

University of California, Los Angeles, Calif.—June 29–August 10

Colorado Agricultural College, Fort Collins, Colo.—July 7–August 17

Pennsylvania State College, State College, Pa.—July 2–August 10.

Syracuse University, Syracuse, N. Y.—July 2–August 10

The National Society for the Prevention of Blindness, 50 West 50th St., New York, N. Y.

Courses to prepare teachers for the education of children with seriously defective vision:

University College, University of Chicago, Chicago, Ill.—June 20–July 27

University of Cincinnati, Cincinnati, Ohio—June 25–July 31

State Teachers College, Buffalo, N. Y.—July 2–August 10

Teachers College, Columbia University, New York, N. Y.—July 9–August 17

University of California, Berkeley, Calif.

June 25–August 3

Elementary Epidemiology
Elementary Public Health

(The above courses are offered in our Inter-session, May 14–June 22)

General Bacteriology
Child Development and Training
History of Nursing
Principles and Practice of Public Health Nursing

Columbia University

DeLamar Institute of Public Health, College of Physicians and Surgeons, New York, N. Y.

June 12–30

School Health Supervision—Medical Inspection, Mental Hygiene, Hygiene and Health Education, and Physical Education.

Teachers College, New York, N. Y.

July 9–August 17

Administration of Health Education in Public Schools
Child Hygiene
Health Education
Health and Physical Education
Health Care of Infants
Home and Community Hygiene
Nutrition and Health
Personal Hygiene
Public Health Nursing
Public Health Administration
Safety Education
School Nursing

Sight Saving Classes
Social Hygiene
Teaching Lip-Reading

Cornell University, Ithaca, N. Y.

July 9-August 17

Gymnastics and Dancing
Health Supervision of School Children
Hygiene of the School Child and Adolescent
Measurements of School Children
Physical Education
Principles of Health Education

Duke University, Durham, N. C.

June 8-August 10

Materials and Methods in Health Education
Materials and Methods of Physical Education
Personal and School Hygiene

*University of Hawaii, Volcano Session,
Island of Hawaii*

June 18-July 27

Principles of Health Education and School Hygiene

University of Illinois, Urbana, Ill.

June 18-August 11

Physical Education
School Program of Physical Education
Training Theory
Health Education and Corrective Gymnastics
Physical Education Program for High Schools
Mental Hygiene in the School
Community Recreation
Theory and Technic of Sports for High School
Student Personnel Administration

*Massachusetts Institute of Technology,
Cambridge, Mass.*

July 5-August 10

Bacteriology

*Michigan State College, East Lansing,
Mich.*

June 18-July 27

General Bacteriology
Medical Biology Courses
Pathological Bacteriology
Personal Hygiene
Sanitary Science

*University of Michigan, Ann Arbor,
Mich.*

June 25-August 3

General Hygiene and Public Health
Mental Hygiene
Child Hygiene
School Health Problems
Methods and Materials in Health Education
Principles of Public Health Nursing
Administration and Organization of Public Health Nursing
Applied Nutrition
Community Health Problems and Epidemiology
Public Health Statistics
Public Health Law and Administration
Rural Hygiene
Industrial Hygiene
Race Hygiene
Public Health Microbiology
Public Health Laboratory Methods
Social Case Work
Municipal and Industrial Sanitation (C.E. 34)

*University of Minnesota, Minneapolis,
Minn.*

June 18-July 28

Public Health

University of Missouri, Columbia, Mo.

June 11-August 3

Nursing
Physical Education
School Hygiene

University of New Mexico, Albuquerque, N. M.

June 5-July 29

Educational Hygiene

New York University, New York, N. Y.

July 9-August 17

Child Hygiene
Methods of Teaching for Health
Organization of School Nursing
Field Work in Mental Hygiene

Northwestern University, Evanston, Ill.

June 25-August 18

Personal Hygiene
Organization and Supervision of Health Programs

Rutgers University, New Brunswick,
N. J.

June 25–August 3

First Aid
Public Health

Smith College—School for Social Work,
Northampton, Mass.

July 1–August 5

Health and Disease
Child Hygiene
Public Health

Stanford University, Stanford Univer-
sity, Calif.

June 21–September 1

Physical Education and Hygiene

Syracuse University, Syracuse, N. Y.
July 2–August 10

Public Health Nursing
Methods in Teaching Home Hygiene
Case Studies in Public Health Nursing
Mental Hygiene
Psychiatry
Methods in Teaching Public Health Nursing
Public Speaking

Vassar College, Poughkeepsie, N. Y.
June 27–August 8, 1934

Institute of Euthenics

Problems of the Modern Family
Parent Education Leadership
Mental Hygiene
Physiology and Nutrition
Child Psychology
Adolescent Psychology
Course for Nursery School Teachers
Food Selection, Preparation and Service

University of Virginia, University, Va.
June 19–July 29 (First Term)

July 30–September 1 (Second
Term)

Biochemistry
Hygiene and Sanitation
Physical Education
Sex Character Education
Mental Hygiene
Bacteriology, Medical

Washington University, St. Louis, Mo.
June 15–July 27

Sociology and Social Work
Education
Family Health
Psychology
Nursing
Public Speaking
Principles of Public Health Nursing
Methods in Health Teaching
Bacteriology

University of West Virginia, Morgan-
town, W. Va.

June 18–July 27

Playground and Community Recreation
Public School Health
Problems in Physical Education

Western Reserve University, School of
Applied Social Sciences, Clevel-
and, Ohio

June 25–August 3

Summer Program in Public Health
Nursing:

Principles of Public Health Nursing
Principles of Mental Hygiene

University of Wisconsin, Madison, Wis.
June 25–August 3

Anatomy
Bacteriology
First Aid to the Injured
Tests and Measurements in Physical Edu-
cation
Health Education in Schools

University of Washington, Seattle,
Wash.

June 20–July 27 (First Term)

July 30–August 30 (Second Term)

Nutrition
Bacteriology
Physical Education Methods
Principles of Physical Education
Introduction to Public Health Nursing
Principles of Public Health Nursing
Supervision in Physical Education
Principles in Health Education
Organization and Administration of Physi-
cal Education

NORTHERN CALIFORNIA PUBLIC HEALTH ASSOCIATION

THE Northern California Public Health Association at its meeting on March 17 in Stockton, elected the following officers:

President—Professor Leon B. Reynolds
President-elect—Dr. J. C. Geiger
Vice-President—Helen Hartley, R.N.
Treasurer—Mary E. Davis, R.N.
Secretary—Dr. I. O. Church
Representative to the Regional Council of the Western Branch—Dr. Frank Kelly
Representative to the Governing Council, A.P.H.A.—Dr. Herbert F. True

SOUTHERN CALIFORNIA PUBLIC HEALTH ASSOCIATION

THE following officers were elected at the meeting of the Southern California Public Health Association on March 7:

President—Charles W. Decker, M.D.
President-elect—J. D. Dunshee, M.D.
First Vice-President—A. M. Lesem, M.D.
Second Vice-President—R. C. Main, M.D.
Secretary-Treasurer—C. G. Wharton, M.D.
Representative to Governing Council, A.P.H.A.—William B. Wells, M.D.

CONGRATULATIONS TO DR. WELCH

ON April 8, Dr. William H. Welch celebrated his 84th birthday; and April 7 was the 50th anniversary of his connection with Johns Hopkins University. He became Professor of Pathology in that university April 7, 1884.

COLONEL THEODORE ROOSEVELT ELECTED PRESIDENT OF NATIONAL HEALTH COUNCIL

COLONEL Theodore Roosevelt was recently elected President of the National Health Council, succeeding William F. Snow, M.D., F.A.P.H.A., who has held that office since 1927.

FULLER & MCCLINTOCK MOVE

FULLER & McClintock on April 30, moved their engineering offices from 170 Broadway, where they have been

located for nearly 30 years, to larger and specially planned quarters in the Park-Murray Building, 11 Park Place, New York, N. Y.

PERSONALS

DR. J. D. DUNSHEE, F.A.P.H.A., of Pasadena, has been appointed Director of the State Department of Health of California. Dr. Dunshee is Chairman of the 1934 Annual Meeting Local Committee.

BRIGADIER GENERAL M. A. DeLANEY, Assistant Surgeon General, U. S. Army, member A.P.H.A., was selected by the University of Pennsylvania Club, New York, as the most outstanding graduate of the University for the year 1934, and was awarded the Guggenheim Honor Cup at a banquet at the Club on March 22. General DeLaney is in command of the Medical Field Service School, Carlisle Barracks, Pa. He is a member of the Delta Omega Society, and many public health organizations.

JAMES A. DOULL, M.D.C.M., Dr.P.H., F.A.P.H.A., Professor of Hygiene and Public Health of the Western Reserve University School of Medicine, Cleveland, O., has been elected an Honorary Fellow of the Royal Sanitary Institute of England.

DR. WADE HAMPTON FROST, F.A.P.H.A., has retired as Dean of Johns Hopkins School of Hygiene and Public Health, effective in July when his term expires. Dr. Allen Weir Freeman, F.A.P.H.A., Professor of Public Health Administration at the school since 1923, has been named to succeed him.

DR. WILLIAM H. BEST has been appointed Deputy Commissioner of Health of New York City. He has been associated with the Health Department for 18 years.

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Organization of Adult Groups for Health Education *

MARY P. CONNOLLY, F.A.P.H.A.

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ALL Americans are "belongers," says George Bernard Shaw, as he pictures even the smallest hamlet with most of its citizens leaving offices, wash tubs, and ploughing to dash off to meetings. Mr. Shaw's opinion offers much encouragement to those who are new in the field of health education. It provides disappointment for those who accept it as a working plan for spreading health information.

Organized groups pave the way for many health advances. This is particularly true when the group sponsors a movement and continues to give it support. If large numbers of persons were affiliated with groups, the problem of disseminating health information through such groups would be simpler. However, a careful analysis of any given community will reveal that the rank and file of citizens do not hold continuous membership in any organization. Americans sample many new enterprises, but the turnover is such that it is a mistake to feel that we have influenced the community with a message

if we have reached only the organized groups. Professional organizations, churches, and those carrying insurance benefits are the only ones that can claim fairly continuous membership.

I believe it is a mistake to assume that those who belong to organizations necessarily are leaders and will be forces in disseminating material given to them. Many persons join clubs or societies because their friends belong or because there appears to be a social advantage in such membership. Responsibility for the undertakings of a society is not always shared by all of its members. There is no doubt that we should include organized groups in any plan for community health education, but they should be only one unit. It is apparent that the bulk of the population which we must reach is not waiting and ready to receive us or our message.

If it is important that the newer knowledges of disease prevention and health education be presented just how shall we go about doing this job?

Every program which aims to change the behavior of individuals may well be built upon 3 separate steps: research, publicity, and direct contact. It is a foregone conclusion that those who deal with health education will not formu-

* Read before the Public Health Education Section of the American Public Health Association at the Sixty-second Annual Meeting in Indianapolis, Ind., October 10, 1933.

late a program without the benefit of research. In our early days, which were missionary in character, we put tremendous zeal into some programs for which we feel apologetic today. We believe we are doing better.

Publicity paves the way; but it does not do more than that. Adults change their habits only after discussion and deliberation. This is a protection because if we changed our habits as a result of the barrage of written and spoken material which descends upon us from radio and newspaper, we would be in a state of confusion confounded, from which we would derive neither health nor comfort. Publicity is important because it draws attention to subjects which need thought. Thinking does precede a rational change of habits in adults. Since most persons have not sufficient background for thinking through many problems in health behavior, they must have personal help in making their decisions.

Personal health advice should come from a physician who knows the individual, his capacities and tendencies. The physician who wishes to practise preventive medicine will have to assume this responsibility if large numbers of persons are to go to him to learn to keep well. It frequently requires much persuasion to convince a man that he needs to go to a physician when he is not ill. It is disappointing to the man when he does not receive advice with his health examination.

In addition to personal health advice it is important in this day of too close living that men and women shall learn something about disease communication and how they may safeguard themselves; something of the principles of sanitary science, if only for esthetic reasons; something about child care and behavior which will give their children a better chance. This intensive education must come from a person who has the time and training to present the ma-

terial in a way in which it may be understood and from which profit will come to the student.

I believe the psychologists have convinced us that if we wish to gain anyone's attention we must start with a recognition of his interests. We can hope to do no better than to hitch our program to the van of interests which carries one's activities.

How shall we know a person's interests? How shall we go about gathering people into numbers which we can reach at a minimum of expense?

In answer to this first question, it is necessary that the person responsible for health education go about among many groups, even when the interests of the groups are not remotely connected with health promotion. This is the only means by which we can learn how the average person thinks and feels. When the timid looking little woman who sits next to you as a member of a group tells you of the health needs of young mothers in her neighborhood, and you can offer her a plan for intensive education for these mothers if she will bring them together, you have made group organization simple; and while your students are being brought together by the interested woman you can go on to claim the attention of other such leaders. The going about should be purposeful on the part of the health educator, in order that all classes will be met.

A study of the community should be made each year to enable the person responsible for the program to determine in which sections effort should be concentrated. If accurate records are kept this is not a difficult matter.

Large numbers of persons must learn to know those who provide health information and to know them well enough to include them in their programs. It may seem a waste of time to serve on a committee which desires to erect a monument to a famous citizen

or to abolish hideous sign boards; but in no other way is it so easy to gain the attention of those who influence public opinion.

This method of organization has a number of points to commend it. The person who asks for health education for a particular neighborhood assumes responsibility for the group. It is the plan of an individual who is proud of it and rarely fails to hold the group together. Each person who joins the group is visited and interested by one who is a neighbor. The education is something for which the group has asked and not a plan imposed upon them by a benevolent municipal or private organization.

Progressive women in churches form many interested groups on a basis of their particular needs. The leader of a cradle roll may ask for a series of lessons on infant care, while the superintendent of a Sunday School will invite parents of older children who wish to learn about communicable disease or child behavior.

Evening schools provide us with a means of incorporating health information in the course of study given to adults who wish to learn to read, write, speak English, or to finish elementary school. In addition to the regular evening classes, extension classes are frequently provided for groups of women unable to go to the regular schools. If the primary interest and need of the group is English, our health information becomes much more vital when it is incorporated in the driving need.

The unemployed who have had to wait for relief in public welfare stations have shown us how eager large numbers of men and women are to learn how to keep well. It is to be hoped that the opportunity for presenting health material to so many, who are ready and eager for it, will never again need to come in the same way. However, the

public health organization that has planned a series of health talks for the large groups who wait in relief stations, and courses to suit the needs of smaller groups that will come together for this purpose, has relieved dispirited men and women of some hours of despair and given them a fund of information which will carry over into better days.

Particular attention should be paid to food budgets and meal planning, the early discovery of tuberculosis, and protection against communicable diseases when persons receiving relief are met. It is wise to distribute those who wish further information among groups not receiving relief in order that a more normal approach may be made to problems which the person finds difficult to solve at the time because of lack of money.

The health educator who is a member of the local board of the Girl Scouts, the Camp Fire Girls, the Boy Scouts, or similar organizations has not only an opportunity for providing a health program for the organization, but through contact with parents and leaders may extend group instruction to adults who would not be contacted in any other way. A particularly successful form of group organization is attained when the program is shared with a psychologist or a recreation leader. Units of study, of which health is one, provide sufficient variety to hold the interest of the group. Here, too, the women are brought together by a friendly person who becomes a member of the class.

In any plan for community education for health it must be remembered that intensive education can be given to a relatively small number of persons. These persons must be made to feel that because of their additional knowledge they have a responsibility for spreading this knowledge to others who are not so well equipped.

Small groups like to feel that they

are a part of a larger movement—that they walk with many. Health guilds serve the purpose of binding groups together and provide a concerted effort in all parts of the city. The guilds are composed of women who have completed a course in health instruction. They meet at regular intervals of 1 or 2 months. A representative from the department of health presents a particular problem to the guild at the meeting, and the members assume responsibility for solving it among their immediate neighbors. This provides a continuation of interest in health matters and a channel for keeping large numbers of persons informed regarding new advances made in public health.

Information given to groups should lead to action. Communities may well expect that those who have received intensive education for health will be interested in seeing that the children of the neighborhood are vaccinated and protected against diphtheria, and that efforts will be made to direct those needing medical care to the regular place for receiving it. The organization providing the education will have the benefit of numbers of persons furthering its program in addition to its regular staff.

Marked differences can be seen in the health behavior of Negroes when large numbers of this race have been reached with specific health instruction. One guild composed of less than 400 women was responsible for the immunization of more than 9,000 Negro children under the age of 5 years. There was a distinct feeling of pride among these women for having been responsible for their own race. Through the efforts of these same women and a group of progressive Negro physicians, it is expected that at least 2,000 Negroes over 15 years of age will be given an X-ray of the chest this month, in an effort to eradicate tuberculosis among their people.

Race prejudices and inter-race en-

imities can destroy group interest. Race prejudices are avoided when groups come together because of mutual interests. Because a neighborhood is largely foreign born does not mean that all of its residents will see eye to eye on any given subject. Even within racial groups, habits and customs are so different that agreement on few subjects can be reached. If the family sympathies are with monarchists, the mother will not be likely to join with a neighbor whose homeland sympathies are liberal, even to learn how to care for her baby.

Stereotyped material never holds the interest of a group for any length of time. When a group is formed it is advisable to meet with it and to prepare lesson plans to satisfy its specific needs. The course prepared for a 12 week period may be divided into 4 units: community health, communicable disease, child hygiene, and home care of the sick. Units may be extended or contracted. Two hour class periods are usual, with half of the period allowed for group discussion which should be carefully guided by the instructor. The course in Home Hygiene and Care of the Sick of the American Red Cross is desirable for those who wish to work for a certificate.

The public health nurse who has had preparation for teaching is the person best fitted to conduct classes for health information. Because of her experience in the homes of many, she is able to understand the needs and limitations of those who come for instruction and the nursing technics which she is able to demonstrate are always a source of pride to the women who learn them. Definite skills which may be shown to a neighbor inspire respect for the information which accompanies them. Groups formed for the study of nutrition should be guided by a nutritional expert.

At present, women must form the large number of those who are given

intensive courses in health. Groups of men may be reached in factories, at luncheons, and at meetings for an occasional talk about important health matters, but organized classes which prepare for leadership can be given only to those who can devote a regular period each week for such education.

With the new leisure provided under recent legislation there is an opportunity for study courses for men who wish to know the health problems of their community. Groups of men should be taught by a man, and the new order is a challenge to men in public health which will have to be met.

Intensive group teaching offers the only means of personal contact with persons who because of their better economic status will not be met by the public health nurse in the home or will not be found in clinics in which conferences are held. This group of self supporting, independent folks fashion

the thinking of most communities. They own their homes; they pay taxes; they are vitally interested in what is provided for the health and welfare of their children. The greater number of these persons have had only such information as they obtained in physiology and hygiene courses in school, high school, or college. They have no means of interpreting the vast amount of so-called health information which appears in the press and is heard over the radio. Public health organizations can make a plan for keeping them informed as to the newer developments in health protection and conservation or they can be left to the winds which blow from bad advertising, cults, and fads. When community understanding is necessary to control disease or support legitimate health projects, the leader with sound information will be found to be of inestimable help in the health organization.

Switzerland—Physical Examinations of School Children

PHYSICAL examinations of school children were recently introduced in the rural districts in Switzerland with the coming into effect of the federal law on prevention of tuberculosis; the examinations were also extended to those city schools where they had not been given previously.

The school physicians in the rural districts serve on a part-time and in the cities on a full-time basis. The maximum number of children which it is considered advisable to allow to each physician is 3,000 in the rural districts and 8,000 in the cities.

In the cities the school children are given a tuberculin test and tested for the rapidity of sedimentation of the blood; those of them presenting sus-

picious symptoms are given a radiologic examination. In rural districts the regular school physician refers the suspicious cases to a specialist. All children in whom tuberculosis is found are referred to special dispensaries where the necessary measures are taken.

The school physicians are required to examine the teachers for tuberculosis. Those afflicted with a contagious form of this disease are given leave of absence with 80 per cent of their salaries. Supervision over the general hygiene of the school buildings is also a part of the physicians' work.—Office International d'Hygiene Publique, *Bulletin Mensuel*, Paris, Jan., 1934.

Transmission Sequence of Syphilis*

WILLIAM A. BRUMFIELD, Jr., M.D., and DUDLEY C. SMITH, M.D.

*Department of Syphilology and Dermatology, University of Virginia,
Charlottesville, Va.*

THE conditions under which syphilis is usually transmitted from one individual to another are simple and generally well understood. Based upon this knowledge reduction and control of the disease have been sought along several lines, particularly, (1) by education of young people in sex matters, urging continence, (2) by educating the incontinent in the use of prophylaxis, (3) by the suppression of commercialized prostitution, and (4) by extending clinical facilities so that the infected persons may seek treatment as early as possible. There are at present no convincing figures showing that these methods have brought about a material reduction in the incidence of the disease in the United States.

More recently, the U. S. Public Health Service through a grant from the Rosenwald Fund has attempted to capitalize in a wholesale way the well known fact that a small amount of anti-syphilitic treatment will render patients non-infectious. In a few selected areas it attempted mass sterilization of the colored population based upon extensive serological survey. It is too early to judge the effectiveness of this attack.

It is proposed to bring to attention in this paper a more direct, intensive, epidemiological attack upon syphilis and to submit the experience of our office and clinic in the use of this method

during the last 2 years. The nature of this approach is identical to that used in the control of other infectious diseases. It depends upon a simple epidemiologic investigation of every early case of syphilis which comes under observation. This investigation is directed toward ascertaining the identity of the person from whom the patient acquired the disease, and the identity of other persons exposed to the same source or to the patient since infection. Having listed as completely as possible the names and addresses of exposed persons, the next step is to persuade as many as possible to seek immediate medical advice with a view to early diagnosis and treatment if needed. The direct effect is to institute early treatment in the patient's interest and to reduce to a minimum the infectious period of each new case as it arises.

This procedure differs from that used in many other contagious diseases only in that we are dealing with a sex matter. Persistence and tact are necessary, but the patient in the office or clinic may be depended upon to give the necessary information. There is nothing particularly new about this approach but with few notable exceptions, public health officials have disregarded its practicability and effectiveness.

During the 2 years, September 1, 1931–August 31, 1933, 568 patients were admitted. Of these, 193 were questioned regarding sex contacts, the names and addresses of possible sources

* Read before the Epidemiology Section of the American Public Health Association at the Sixty-second Annual Meeting in Indianapolis, Ind., October 11, 1933.

TABLE I

DISCOVERY OF EXPOSED PERSONS THROUGH QUESTIONING OF ORIGINAL CASE AND ADMISSIONS TO THE CLINIC CONSEQUENT UPON FOLLOW-UP

	Original Cases	Named	Contacts						
			Individuals Represented	Consequent Admissions					
				Voluntary No.	%	Follow-up No.	%	Total No.	%
White	67	129	101	18	18.0	42	42.0	60	60.0
Colored	90	216	177	19	10.7	47	26.5	66	37.2
Total	157	345	278	37	13.3	89	32.1	126	45.3

of infection and contacts since infection. Questions were limited to the following groups: patients from the city, county and adjoining districts, since we had no means of following up patients in distant localities; patients of all ages having recent infections or in infectious stages; all patients between the ages of 15 and 30 years since these are more apt to have recent infections, and being in the ages of greater promiscuity, are more apt to spread the disease. This selection was arbitrary, each case being judged on its merits. Of the patients questioned, 157 or 81.3 per cent gave the desired information; 34 professed ignorance of the real identity of their consorts or named contacts in distant localities, while 2 refused to name them. Contacts and facts concerning 1 of these were cleared up by a second patient.

The follow-up of contacts was started immediately upon their identification. Infectious patients were started on sterilizing therapy as soon as possible and all suspects placed under observation, treatment being instituted at the first diagnostic evidence of infection. Each patient was instructed to try to get his or her contacts to be examined. Letters were sent to contacts advising them to report for examination. A

nurse visited contacts and urged them to consult their physicians. When other measures failed, contacts were reported to the health officer.

The discovery of exposed persons through questioning the original cases, and admissions to the clinic consequent to follow-up are shown in Table I. One hundred and fifty-seven patients questioned gave 345 names which, removing duplicates, involved 278 individuals, 126 of whom were admitted to the clinic, 37 coming for examination voluntarily. Undoubtedly some others would have come in eventually, but through follow-up measures we were able to bring in 89 others, many of whom were ignorant of the possibility of infection. Follow-up increased the proportion of infected individuals who were brought under treatment in the early stages, thereby reducing the period of infectiousness and increasing the possibility of cure.

Table II shows the admissions of contacts to the clinic consequent to the various agencies of approach or because of their own volition. The effective methods are varied. There was little compulsion as noted by the fact that the aid of the health officer was solicited in only 7 instances. The later method was used as a last resort in

TABLE II

ADMISSIONS TO THE CLINIC OF INDIVIDUALS NAMED AS CONTACTS BY THE ORIGINAL CASES
CONSEQUENT TO VARIOUS AGENCIES OF APPROACH OR BECAUSE OF THEIR OWN VOLITION

Follow-up Through	Consequent Admissions to Clinic						
	White		Colored		Total		
	Male	Female	Male	Female	Male	Female	Both
Friends	14	4	3	6	17	10	27
Letters	5	8	3	9	8	17	25
Clinic Physician	6	2	17	5	23	7	30
Health Officer	0	3	1	3	1	6	7
	25	17	24	23	49	40	89
Voluntary	9	9	7	12	16	21	37

selected cases, all information being kept confidential so far as possible.

The syphilitic seeking advice may be the means of uncovering many other patients just as we may determine carriers of other infectious diseases. Through careful history taking it is possible to trace the transmission from person to person with a fair degree of

accuracy. Such an example is shown in Figure I. Of this group 19 were placed under observation within a 2 month period. We were unable to locate the remainder. No new infections have been traced to any of this group since it was cleared up 20 months ago.

A summary of the entire study is shown in Table III. The original

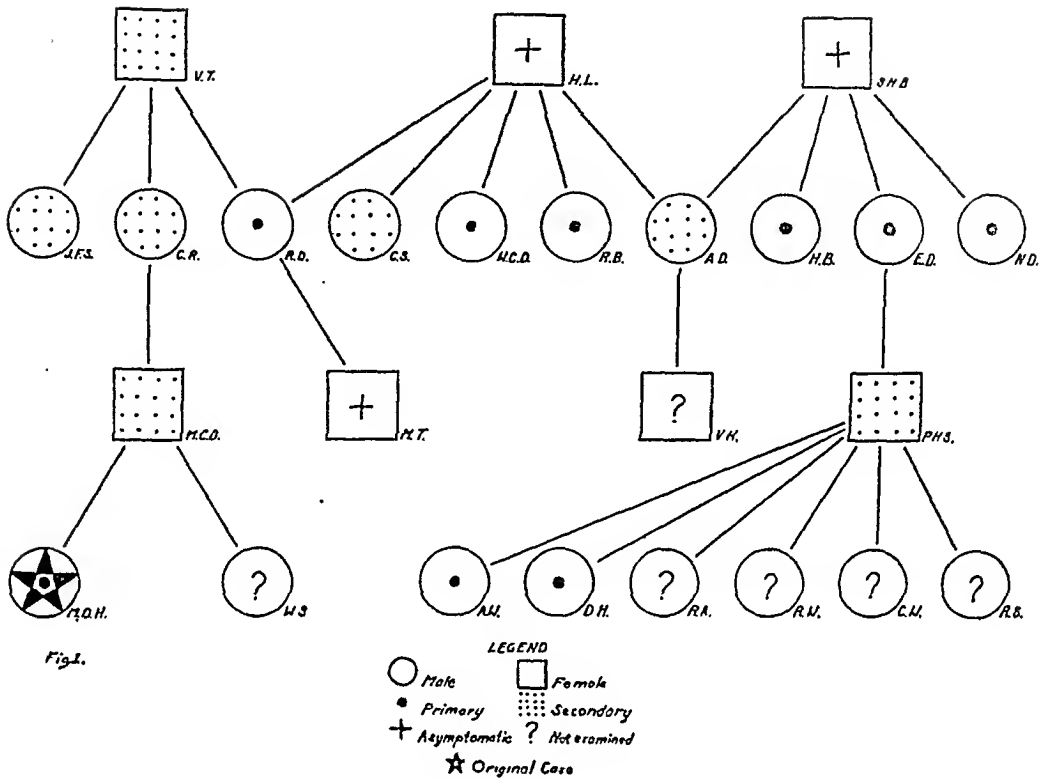
TABLE III

NUMBER OF EXPOSED CONTACTS PER CASE AND ESTIMATED NUMBER OF INFECTED CONTACTS PER CASE OBTAINED BY FOLLOW-UP INVESTIGATION

	Original Cases (a)	Exposed Contacts						
		Total No. (b)	No. per case (c)	Admitted to Clinic			Estimated	
				Total No. (d)	No. Found Infected (e)	Per cent Infected (f)	Total No. Infected* (g)	No. Infected per case (h)
White	67	101	1.50	60	48	80.0	80	1.20
Colored	90	177	1.95	66	46	69.7	123	1.36
Total	157	278	1.77	126	94	74.6	203	1.29

* Estimated Total Number Infected obtained by applying percentage in sample group (d) to total number of exposed contacts (b).

FIGURE I
TRANSMISSION FROM PERSON TO PERSON



cases here embrace all patients who named contacts. Contact exposure rate is shown in column (c). This exposure rate is an index of promiscuity and is not related directly to the spread of syphilis. It is true that a decrease in this rate will necessarily reduce the incidence of the disease. It is toward the reduction of this figure that sex educational measures are directed, but results from any attack at this point will be slow to materialize. The infected contacts per case is shown in column (h). It is this figure in which we are most interested, and diligent contact follow-up will reduce this. So long as this figure remains greater than 1.0 an increase in the incidence of the disease is indicated. When it becomes less than 1.0 a decline is indicated. The immediate follow-up of contacts with resulting sterilization will tend to lower the infected contact rate and this procedure

can be more readily carried out than the elevation of the moral standards. The accuracy of the figures given here is limited by the accuracy and completeness of the information obtained. The estimates may be higher than the actual number of infections since those persons presenting themselves to the clinic probably include a majority of the infected individuals, who had reason to come. For every patient diagnosed or examined there was at least one who was not seen. The incidence is probably lower in the latter group.

A similar study applied to source cases is shown in Table IV. Each patient was shown by analysis of histories to be the source of at least one infection. The white patients of this class present a contact exposure rate much higher than in the general group, whereas there is slight increase in the promiscuity index in the colored source

TABLE IV

NUMBER OF EXPOSED CONTACTS AND ESTIMATED NUMBER OF INFECTED CONTACTS PER CASE KNOWN TO BE THE SOURCE OF AT LEAST ONE INFECTION

	Source Cases	Exposed Contacts						
		Total No.	No. per case	Admitted to Clinic			Estimated	
				Total No. (d)	No. Infected (e)	Per cent Infected (f)	Total No. Infected (g)	No. Infected per case (h)
	(a)	(b)	(c)					
White	24	62	2.5	51	46	90.1	56	2.3
Colored	27	54	2.0	39	36	92.3	50	1.8
Total	51	116	2.2	90	82	91.1	106	2.0

cases. This difference is due in part to the fact that several clandestine prostitutes are represented in the white source cases. In addition we found it more difficult to obtain full information from the colored patients. The infected contact rate is also considerably higher in the white group than in the colored in which commercialized vice is negligible. Through the follow-up of prostitutes a great step is made in preventing the spread of syphilis in the white population. In the colored race the entire population must be dealt with.

A further analysis of the stage of the disease in the source cases reveals that with 1 exception the disease was early, having been acquired within a year. This was a delinquent patient, with little treatment, who developed a mucocutaneous relapse and infected his fiancée through kissing. Of the 51

known source cases, 8 had primary lesions at the time of admission, 22 had secondaries and 20 were diagnosed serologically, but the histories indicated early infections. Efforts should be directed toward treating these patients and rendering them non-infectious.

SUMMARY AND CONCLUSIONS

These results show that it is practical to trace sources of infection and exposures in syphilis. A large majority of new patients will volunteer the necessary information and the follow-up may be readily carried out by the clinician with infrequent aid of law enforcement. Immediate follow-up by means of letters and personal communications is sufficient to increase greatly the proportion of exposed persons brought under treatment in early stages.

Arsenic Poisoning by Pies

CHARLES H. LA WALL, F.A.P.H.A., and JOSEPH W. E. HARRISSON

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of Agriculture, Philadelphia, Pa.*

EARLY in January, 1934, a number of persons in the northeast section of Philadelphia were made sick by eating pies manufactured by a local baker. The pies were of different varieties, including apple, lemon, and mince. The members of the baker's own family were among those who had suffered illness after eating portions of the pies. The symptoms were those of gastrointestinal irritation, all of the cases being characterized by vomiting and diarrhea. Investigation of this situation by John H. Tryon, General Agent of the Bureau of Foods and Chemistry of the Pennsylvania Department of Agriculture, resulted in his bringing to our laboratory a specimen consisting of half a lemon pie.

Analysis of the pie revealed the presence of arsenic in remarkably large amounts. The weight of the sample submitted was 375 gm., of which 255 gm. was filling, and 120 gm. was crust. A quantitative determination of the arsenic in both crust and filling showed 0.184 per cent of arsenic trioxide in the crust and 0.015 per cent of arsenic trioxide in the filling. This pointed clearly to the fact that the contamination was probably due to some ingredient used in the crust. The bakery was visited and a number of samples of raw materials taken for examination, none of which was found to contain arsenic. The baker then recollected that the crust of all of the pies made on the day previous to the one on which the people became ill had been made with corn meal which was part of a lot

purchased at an auction sale a few days previously, which had included the stock of a grocery store which had become bankrupt. He recollected also that one of the cartons of corn meal had been opened and was only partly filled when he received it. Investigation through the auction company and subsequently through the former manager of the store whose products had been sold, revealed the fact that there had been a box of corn meal opened and the contents mixed with sugar and rat poison, then put back and kept for use in poisoning rats. The store manager also admitted that this package of corn meal had not been labeled and that only a few of the people in the store knew about it, and that it could easily have been sold and used as corn meal.

Approximately 150 people were reported as having been made ill from eating 30 pies which the baker admitted having distributed. Many of them required medical attention, but only 1 was taken to a hospital. This patient was discharged within 48 hours as cured. The absence of any fatalities in this case of wholesale poisoning, which was due to gross negligence, may be accounted for by the fact that the arsenic was present in such large amounts, as the calculations showed that each pie contained between 7 and 8 grains of arsenic trioxide. The baker suffered no loss of prestige, apparently, as he and his family had also been victims, and he had been prompt and generous in payment of fees for medical attendance of victims of the accident.

Immunization of Humans with Alum Precipitated Tetanus Toxoid*

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FOLLOWING a study of the immunizing effect in guinea pigs treated with tetanus toxoid a preliminary report of which has been published¹ our studies were directed to the immunization of humans.

The local effect of the plain toxoid, in causing smarting, lasting for 5 minutes or longer, showed that plain toxoid is an undesirable preparation. An investigation on the effect of the addition of potash alum was carried out. It was believed that the addition of potash alum would enhance the antigenic action of the toxoid, and that by washing the alum precipitate with sterile normal saline solution, following the procedure of Wells, Graham, and Havens² would reduce the content of nonspecific protein in the toxin. The alum precipitated toxoid generally causes neither local nor general reaction, except slight local soreness in persons who are highly susceptible to the proteins in culture media.

The following reports on the antitoxic content of the serums of persons that had received prophylactic injections of tetanus toxoid have been found in the literature:

Ramon and Zoeller³ tested the blood serum of 12 persons that had received 2 or 3 injections of 1 c.c., 1.5 c.c., and 2.0 c.c. of tetanus toxoid. Three or 4

years later the antitoxic content of the serums ranged from 1/500 to 1/6 (American) unit per c.c. of serum.

Another individual received 3 doses of tetanus toxoid and some time later a 4th dose was given; 1 c.c. of this person's serum neutralized 1,500 m.l.d. of tetanus toxin, representing 1.5 units of antitoxin per c.c.

Lincoln and Greenwald⁴ treated 5 adults and 13 children with 3 doses of 0.5, 1.0 and 1.5 c.c. of tetanus toxoid at intervals of a week. Four to 8 months later blood was drawn and the serum tested for antitoxin. The serums of 4 children contained sufficient antitoxin to neutralize 1 to 2 m.l.d. of tetanus toxin, while the serums of the other persons contained only traces of antitoxin. Without further injections of toxoid the amount of antitoxin found in 2 of the children on retesting 18 to 19 months later was sufficient to neutralize 5 m.l.d. of tetanus toxin with 1 c.c. of serum.

Of 7 individuals whose serum contained only a trace of tetanus antitoxin 4 to 8 months after a series of injections of tetanus toxoid, without further injections of toxoid, 6 individuals were retested 12 to 18 months after the first test. Three adults and 1 child still showed only a trace of antitoxin while 2 other children had developed sufficient antitoxin to neutralize 5 m.l.d. of tetanus toxin with 1 c.c. of serum.

Some of the other individuals whose serum contained only a trace of anti-

* Read before the Laboratory Section of the American Public Health Association at the Sixty-second Annual Meeting in Indianapolis, Ind., October 12, 1933.

toxin 4 to 8 months after receiving three injections of tetanus toxoid were given further injections of 3 or 4 doses of tetanus toxoid. When tested 6 months later 1 c.c. of their serum neutralized from 25 to 75 m.l.d. of tetanus toxin.

Sacquépée⁵ tested the blood of 240 persons that had received a series of 3 injections of tetanus toxoid of 1.0 c.c., 1.5 c.c., and 2.0 c.c. at intervals of 10 days. Six months later he found the following amounts of antitoxin per c.c. of serum: One serum contained $\frac{1}{2}$ a unit (American) of antitoxin, 6 serums contained $\frac{1}{3}$ unit, 120 serums contained $\frac{1}{10}$ unit, 68 serums contained $\frac{1}{30}$ unit, 10 serums contained $\frac{1}{40}$ unit, 22 serums contained $\frac{1}{50}$ unit, 4 serums contained $\frac{1}{60}$ unit, 3 serums contained $\frac{1}{100}$ unit, and 6 serums contained less than $\frac{1}{100}$ unit.

Zoeller and Ramon³ first reported on the use of tetanus toxoid for prophylactic treatment of humans in doses of 1.5, 1.0, and 2.0 c.c. injected subcutaneously.

The toxoid employed in the studies here reported was prepared from a toxin containing 10,000 m.l.d. per c.c. The toxin was detoxified with 0.4 per cent formaldehyde. The toxoid was precipitated with 2 per cent of potash alum, washed twice with and resuspended in normal saline solution. Merthiolate was added to make 1:10,000 dilution. The addition of potash alum to toxoid is believed to retard the rate of absorption and thereby appears to increase the antigenic action, so that it might be used in doses of 1 c.c. The antigenic effect of the alum precipitated tetanus toxoid was tested on guinea pigs by the injection of 1 c.c. The antitoxic content of the blood was tested 6 and 8 weeks later. From the results obtained it is believed that information has been secured as to the prophylactic value of alum precipitated toxoid for the induction of active immunity to tetanus infection in human beings.

Five guinea pigs were given a single injection of 1 c.c. of the alum precipitated tetanus toxoid. Six weeks after the injection of the toxoid the guinea pigs were bled. The serum was separated from the clot and the amount of antitoxin was determined by testing the neutralizing value of the serum when mixed in different amounts with 0.1 L+ dose of standard tetanus toxin and injected subcutaneously into normal guinea pigs.

It was found that a dose of 2.0 c.c. of pooled guinea pig serum, when mixed with 0.1 L+ dose of standard tetanus toxin and injected into the subcutaneous tissue of normal guinea pigs, gave protection to the animals, while 0.2 c.c. of the guinea pig serum failed to protect. Each c.c. of the pooled guinea pig serum, therefore, neutralized at least 50 m.l.d. of tetanus toxin, or contained $\frac{1}{20}$ of a unit of antitoxin per c.c.

Eight weeks after the injection of the dose of tetanus toxoid the guinea pigs were again bled and the pooled serum was tested in the same manner. In this test 0.2 c.c., 0.3 c.c. and 0.4 c.c. each gave complete protection against 0.1 L+ dose of tetanus toxin, representing the neutralization of at least 500 m.l.d. of tetanus toxin or $\frac{1}{2}$ unit of antitoxin per c.c.

Our study of the antigenic effect of a single dose of alum precipitated tetanus toxoid in human beings was started on 33 adults and on a boy 10 years of age. About 5 c.c. of blood was first procured to ascertain whether normal persons have tetanus antitoxin in their blood. None of the specimens of normal blood showed the presence of measurable amounts of antitoxin.

Immediately after withdrawing blood from 34 individuals each received an injection of 1 c.c. of the alum precipitated tetanus toxoid by deep subcutaneous injection into the upper portion of the arm.

The serums of 8 of the 34 persons that had received a dose of 1 c.c. of the alum precipitated tetanus toxoid from 25 to 42 days earlier, were tested for antitoxic content, and 4, who were within the age group of 20 to 30 years, showed from 1/1000 to 3/1000 of a unit of antitoxin per c.c. The other 4 tested showed only traces of antitoxin. The 4 that showed measurable amounts of antitoxin had received the dose of antitoxin only 25 days prior to the tests. The serums of 2 individuals, who were over 50 years of age, when tested 68 days after treatment with tetanus toxoid showed only a trace of antitoxin.

It is realized that more time must elapse before measurable quantities of antitoxin can develop in human beings, especially in persons over 50 years of age. However, since guinea pigs receiving a dose of 1 c.c. of the alum precipitated tetanus toxoid developed as much as $\frac{1}{2}$ of a unit of antitoxin in 1 c.c. of serum in 8 weeks, it is believed that human beings after an injection of a dose of 1 c.c. will show at least 1/250 of a unit of antitoxin in 6 to 8 months.

The relative importance of active immunization with tetanus toxoid over passive immunization with tetanus antitoxin is readily appreciated by those who have been engaged in the control of diphtheria infection. The incidence of diphtheria infection remained relatively high in different communities until active immunization with T-A mixture, and more recently with diphtheria toxoid, became a routine procedure, especially in the protection of children in the preschool age.

It is believed that active immunization against tetanus infection by the use of alum precipitated tetanus toxoid, is of great importance in conserving health, especially for those individuals within certain age groups and for those engaged in civil and military pursuits where the potential danger of tetanus

infection is high. Active immunization against tetanus will materially lower the incidence of tetanus infection in persons engaged in certain industrial occupations: in railroad employees, in miners, in lumbermen, in those engaged in agriculture, and especially in the personnel of the military services. Active immunization against tetanus infection is especially indicated for anyone who is engaged around machinery in industry, or those who ride in automobiles and trucks, in the highly congested traffic on our public highways.

Ramon and Zoeller³ have pointed out that if a person actively immunized against tetanus, should meet with an injury, he should not receive a dose of tetanus antitoxin (as would be the practice with a nonimmune person) but should receive a second dose of toxoid. This second dose would quickly raise his immunity to a higher level and protect him against infection. From the reports in the literature with regard to the persistence of the active immunity it is evident that it would not be necessary to administer a dose of toxoid after each injury. In persons who are injured frequently a dose of toxoid given annually would probably give ample protection.

There is as yet no fixed opinion as to the degree of immunity against tetanus that should be attained from the first dose of tetanus toxoid, the "primary stimulus." French investigators have so far reported no occurrence of tetanus infection in persons actively immunized by a series of 3 injections of plain toxoid.

It is believed that we may take the experience with diphtheria toxoid as an index of the degree of active immunity necessary for protection against tetanus infection. Diphtheria toxoid that induces the development in 6 weeks of 2 units of antitoxin per c.c. of serum in a normal guinea pig, is considered satisfactory for prophylactic use in humans whether 1 or 2 doses are ad-

ministered. It appears reasonable that a tetanus toxoid inducing the development, in 8 weeks, of $\frac{1}{2}$ of a unit of antitoxin per c.c. of serum in a guinea pig of standard weight may also be satisfactory whether 1, 2, or 3 doses are administered. A Schick negative individual has $\frac{1}{30}$ of a unit of diphtheria antitoxin in each c.c. of his blood serum. On this basis it is believed that a person who has been treated with tetanus toxoid should have at least $\frac{1}{250}$ unit of tetanus antitoxin in his blood serum 6 to 8 months later. From the evidence contained in the reports on the antitoxic content of the serum of treated persons (Ramon and Zoeller,³ Sacquépée,⁵) it is evident that the 3 doses injected by the French investigators generally induced even a much higher antitoxic content.

The development of active immunity against tetanus in the treated individuals is influenced by several factors. The age of the individual is a definite factor in the development of immunity to tetanus as well as other diseases. Lincoln and Greenwald⁴ found that 4 of 13 children, 4 months after treatment, had sufficient antitoxin in their blood to neutralize 1 or 2 m.l.d. of tetanus toxin, while 5 adults and 9 other children showed only traces of antitoxin.

In our own studies on the serums of 8 individuals we found that 4 persons between 20 and 30 years of age had developed measurable amounts of antitoxin 25 days after receiving a dose of tetanus toxoid while 2 of the 8 individuals who were over 50 years of age had not developed measurable amounts in 68 days.

The development of tetanus antitoxin in the blood of persons is a slow process and requires several months before appreciable amounts of antitoxin can be detected. Lincoln and Greenwald found that of 6 individuals, 3 adults and 3 children, who, 4 to 8 months after

treatment, showed only a trace of antitoxin, and were not reinjected, 2 of the children, 12 to 18 months later had developed sufficient antitoxin to neutralize 5 m.l.d. of tetanus toxin. From these results it is evident that time is an important factor in the development of tetanus antitoxin in human beings.

Other factors, of unknown nature, also influence the development of antitoxin as shown by the variation in the degree of immunity induced in different horses treated with the same tetanus toxoid; in the treatment of different guinea pigs with the same tetanus toxoid; and the variation in the antitoxic content of the serums of human beings. The factor which is probably of greatest influence in this particular is the physical condition, as influenced by other diseases, of the horse, guinea pig, or man, at the time of receiving the treatment.

Tetanus toxoid should not be used for therapeutic purposes. It should not be injected into a nonimmune person at the time of receiving an injury. Persons actively immunized with tetanus toxoid when injured, should receive another dose of tetanus toxoid, while persons who are not actively immunized should receive a dose of tetanus antitoxin. In such an individual active immunization may be carried out by giving a dose of tetanus toxoid about 2 weeks after the receipt of a dose of tetanus antitoxin, following an injury.

The points of special importance in the use of alum precipitated tetanus toxoid are: (1) The induction of an active immunity in 3 to 6 months. (2) The absence of either local or general reaction from the dose of alum toxoid, except slight local reaction in occasional individuals who are highly sensitive to the proteins contained in culture media. (3) Absence of danger of sensitizing the individual to horse serum proteins such as may occur from repeated prophylactic doses of tetanus

antitoxin when used for prophylaxis following injuries.

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Houston Adopts a Cross-Connection Idea Worthy of Note

H. N. OLD

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THE officials of the City Water Department at Houston, Tex., are "on their toes" and apparently taking advantage of every opportunity to safeguard the quality of the municipal water supply. As an evidence of this alertness there is shown below a rather commendable policy which has been adopted in the furtherance of their campaign seeking the elimination of all cross-connections.

The writer was afforded the privilege recently while in Houston of reviewing the reports of a survey and resurvey of a condition in the basement of a large office building at which several connections between the city water supply and the building sewer were found to exist. Unfortunately the attitude of the building management was distinctly antagonistic toward making the required changes, expressing itself as believing that the matter was of no importance and simply an attempt on the part of the City to "give somebody a job."

The discussion of the Chicago amebic dysentery outbreak as presented in *Time* of February 12, 1934, was pasted upon the left hand side of a City of Houston letterhead and numerous photostats produced, one of which was used in

replying to the officials of the office building referred to.

In the course of a sanitary survey of the Houston water supply in 1928 some 6 or 8 instances of cross-connections between the municipal and private supplies were recorded with the expectation that this list would probably be increased to 15 or 20 by a comprehensive cross-connection survey.

On March 4, 1930, a cross-connection ordinance was passed by the city and on December 15, 1930, one engineer was assigned exclusively to cross-connection surveys and elimination. During the 3 year period, 1931 to 1933 inclusive, there were made 199 surveys (including resurveys) and 113 cross-connections definitely eliminated, 44 in 1931, 44 in 1932, and 25 in 1933.

The city ordinance includes authority for the discontinuance of water service until such time as conditions are made safe in addition to a maximum fine of \$200 each day after the period granted for correction constituting a separate offense.

It is believed that the success of this phase of the water supply sanitation program at Houston has been due to the efficiency with which the surveys

have been conducted, the diplomacy on the part of the water department officials in negotiating with building owners involved and the distinctly coöperative attitude on the part of the large majority of these property owners.

LETTER SENT OUT BY HOUSTON WATER DEPARTMENT

God & Plumbing

Like typhoid, the germs of amebic dysentery may be spread through water contaminated by sewage. But when Chicago belatedly reported a full-fledged dysentery epidemic as *A Century of Progress* was closing wisecracks assumed that the second city in the land had up-to-date sanitation and therefore the germs could have been transmitted only on food infected by dirty-handed hotel employees (*TIME*, Nov. 20). Last week in the *Journal* of the American Medical Association a committee of experts on sanitation and tropical diseases, including National Institute of Health Director George W. McCoy, Mayo Clinic's Dr. Thomas B. Magath & Maryland's Board of Health Engineer Abel Wolman, reported its recent investigations in Chicago. The experts laid blame for the epidemic on an Act of God and defective plumbing in the two hotels which were the chief sources of infection. The committee clemently referred to the hotels as C and A, but everyone knew it meant South Michigan Boulevard's big, popular Congress and its smaller neighbor, the Auditorium.

The committee found the hotels' water and sewerage piping systems so old and faulty that when heavily taxed they would let waste from bathtubs and toilets siphon back into drinking water pipes. Water and sewer pipes were cross-connected. Sewers were leaky. Last June 29 a heavy rain overloaded sewers near the Auditorium, flooded its basement. Three days later another cloudburst broke two of the Congress' sewers, filled its ice storage house and covered its food-packed basement three to six inches deep with muck.

Connections between sewage and water pipes have since been cut. But, said the committee: "Unless the antiquated plumbing and conditions of food-handling found in Hotels C and A are remedied, there seems to be no warrant that a recurrence of the outbreak here considered may not develop under similar conditions."

Up to last fortnight 41 deaths and 721 cases of amebic dysentery in 206 cities had been apparently traced to Chicago. The committee cleared Chicago's Health Commissioner Herman Niels Bundesen of laxness or negligence in handling and publicizing the epidemic. Last week Commissioner Bundesen promised rigid plumbing and food inspection, called for an emergency staff of 20 sanitary engineers.

TIME, February 12, 1934

February 28, 1934.

Blank Bank and Office Bldg.,
Houston, Texas.

Att'n Mr. John Doe,
Vice-President

Gentlemen:

Referring to our letter of the fifth of February and your answer dated February 8th, concerning the existing cross-connections between water service lines and sewer lines in the basement of your building, we are informed that no steps have been taken to eliminate these cross-connections as requested by us.

This office made its first survey of your piping connections in July, 1929, and the condition complained of was in existence at that time. Due to some oversight, the matter was not brought to the attention of the former owners of the building. A re-survey was made on the thirtieth of January, this year, in connection with our usual routine and the cross-connection was found to still exist.

In March, 1930, the City Council approved an ordinance covering cross-connections, a copy of which is attached hereto, and this office has been working since that time on the elimination of these health hazards. Your attention is invited to the article reprinted on this page as evidence of what might occur if such conditions as now exist in your piping were allowed to continue.

In accordance with the provisions of the above mentioned City Ordinance, you are hereby notified that the cross-connection between city water lines and the sewer, now existing in your building, must be eliminated within the time specified in said City Ordinance or we shall be forced to take such steps as will protect the purity of our public water supply.

We believe that with these facts at hand we may expect your complete coöperation toward the end that the health of your employees, tenants and the public may not be subjected to the hazards that now exist.

Yours very truly,
J. B. Dannenbaum, Engineer,
Water Division

Diphtheria Prevention in Charleston, West Virginia

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IN 1929 a campaign of diphtheria prevention was organized jointly by the City Health Department and the School Health Service. Toxoid was offered to all children in the first 6 grades. The response was very gratifying, it being estimated that over 75 per cent of these children were protected.

During the following 3 years the work was restricted to students entering the Charleston schools for the first time. For several reasons the immunization program was not pushed and the per cent of children immunized decreased. During these years there was very little change in the case and death rates from diphtheria. The Health Commissioner realized that the system which was followed was inadequate and reached only a small per cent of the preschool children. These campaigns, however, stimulated an interest in diphtheria protection on the part of the physicians of the city. There was not only an increase in the interest on the part of the physicians but a growing hostility toward the official health agencies providing the services which the physicians felt belonged to them.

In May, 1933, a paper was presented at the Annual Meeting of the West Virginia Medical Association in Charleston, outlining the program of professional participation which has been sponsored in Detroit by the Wayne County Medical Society and the Department of Health, and in three rural counties of southwestern Michigan by

the W. K. Kellogg Foundation. So great was the response to this paper that an informal luncheon meeting was entirely devoted to further discussion of this subject. The officers of the Kanawha County Medical Society and the Health Commissioner of the City of Charleston decided that the next diphtheria campaign should be along the lines of the programs established in Michigan.

When the public schools opened in September, such a plan was earnestly considered but the financial condition of the City of Charleston prevented the Health Department from initiating the program at that time. The Health Commissioner had decided that it would be necessary to have toxoid available without cost to the physicians if the campaign were to be a success. During the month of September, 8 cases of diphtheria were reported and in the first 8 days of October, there were 5 additional cases. While attending the Annual Meeting of the American Public Health Association at Indianapolis, the Health Commissioner decided that the diphtheria campaign was an urgent need in Charleston. The State Health Commissioner offered to furnish toxoid without charge to physicians. Returning to Charleston, the Health Commissioner met with the local society and it was decided immediate action should be taken. The President of the Medical Society appointed a Public Health Commission consisting of 5 members, 2 of

pediatricians. During the month of October there were reported 21 cases of diphtheria and the disease seemed to be on the increase. Reports from the State Health Department indicated a rapid increase throughout southern West Virginia.

The Commissioner decided that 2 weeks would be required to prepare both the physicians and the public. An outline was sent to all physicians explaining the nature of the proposed campaign and requesting each physician to return a card indicating whether or not he would be willing to cooperate in the project. There are about 125 physicians in active practice in Charleston and, of this number, 88 agreed to cooperate. The committee divided these 88 names into 5 groups and each member of the committee agreed to telephone or personally see the physicians on his list and thoroughly inform them of the details of the plan.

The plan briefly was as follows: (1) On November 9 and 11, at the hours from 3:00 to 5:00, all cooperating physicians would be in their offices, prepared to immunize children; (2) for those whom the physician judged able to pay, a charge of \$1.00 per visit would be made; (3) those unable to pay would be immunized without charge; (4) individuals desiring to come to the physician at other hours than those specially designated would be charged whatever the physician deemed proper; (5) there would be no free clinics or school clinics held by the Health Department nor by the School Health Service. A mass meeting was held for the detailed instruction of the cooperating physicians.

During the 2 week period immediately preceding the opening of the campaign a constant program of public instruction was carried on through the press. The local radio station offered its facilities for evening talks and 3 radio talks were given. Hundreds of

pamphlets urging immunization were distributed to the school children in the lower grades. The public health nurses urged immunization wherever and whenever they made calls for any purpose. A series of talks to all the Parent-Teacher Associations was inaugurated.

Cards were obtained and distributed to physicians for the purpose of recording the name, address, age, date of doses (2 dose toxoid being used), and a space was provided for recording whether the patient paid or was considered a charity case. At the same time pads of immunization certificates were left with the physician to give to the parents upon completion of immunization.

During this time new cases of diphtheria were being reported almost daily, and 2 deaths occurred. The public was kept fully informed concerning the prevalence of the disease. In accordance with the pre-determined plan the physicians devoted a total of 4 hours of their time to the immunization program on November 9 and 11. Two days later, that is, on November 13, the Health Department called upon all the cooperating physicians to report the number of children who had received a first dose of toxoid. The tabulation showed that approximately 1,200 children from 6 months to 6 years of age, and another 1,200 over 6 years of age had received their first treatment. This represents approximately two whole age groups in Charleston. The high per cent of pre-school children protected was especially impressive. Postcards were supplied to all physicians to be sent to parents just before the second dose of toxoid was due.

In the middle of December report cards were collected from all cooperating physicians, and a second letter was sent to the parents of those children who had not returned for their second dose of toxoid. A tabulation made at that time showed a total of 2,905 com-

plete immunizations and 1,404 of these were for children from 6 months to 6 years of age. For individual years there were as follows: 6-12 months, 162; 1-2 years, 212; 2-3 years, 245; 3-4 years, 286; 4-5 years, 250; 5-6 years, 249; 6-7 years, 222; 7-8 years, 239; 8-9 years, 210; 9-10 years, 182; 10-11 years, 181; 11-12 years, 114; 12 and over, 303; and miscellaneous 50. The miscellaneous represent the group in which no age was recorded. It is estimated that there are 5,500 children in Charleston between 6 months and 6 years of age. It would therefore appear that about 25 per cent of these children were immunized during the campaign.

In order to make a further check on this figure, the school physician sent questionnaires to the parents of all first grade children in 5 representative schools, 4 white and 1 colored. In the questionnaires it was asked how many children were in the family under 6 years of age; of these how many had been immunized before the campaign and how many were protected during the campaign. The same question was asked for children from 6 to 12 years of age. The questionnaires were satisfactorily returned and the figures indicated that approximately 50 per cent of both groups are now immunized and that these are rather evenly divided into 25 per cent protected during the campaign and 25 per cent protected prior

to the campaign. The closeness with which this survey approximates the actual figures reported by the physicians leads us to believe that the estimate is a very fair one.

During the month of January, 1934, there were reported 7 cases of diphtheria. In February no case was reported. During the first week of March there was reported 1 case, that of a woman 37 years old. A special report received from 24 of the coöperating physicians indicated that the parent had paid for the service in 462 instances, while 459 services were given without charge. It therefore appears that the parents paid for the service in 50 per cent of the cases.

It has been shown that an immunization campaign can be successfully carried on without the aid of mass clinics by the official health agency. Active coöperation on the part of the local physicians under the direction of a strong steering committee is essential to success. The campaign played a definite part in checking an epidemic of diphtheria. No reactions of serious import were reported. If the 1 dose alum toxoid had been used, approximately 175 more immunizations could have been counted. The Kanawha County Medical Society has gone on record favoring a continuation of this type of medical participation in public health work and its extension to other immunizations as soon as practicable.

ice, while in 1930 the number had reached 31. Twenty states had specifically allotted funds to laboratory service in 1915, and the number increased to 42 in 1930 with several others maintaining laboratory work through unallotted appropriations. Some 16 states appear to have had sanitary engineering service organized in 1915, but in 1930 all states had service of this character organized either under a special division or in relation to another departmental activity. Thus, in 3 of the basic functions of a state health organization, steady growth over a period of 15 years has resulted in nationwide development of emphasis on the technical excellence of service as measured by the organization of technical divisions.

Another fact indicating this same trend is the increasing emphasis on special training of public health personnel. Within the period under discussion a number of university courses and no less than 3 schools of hygiene and public health have been developed as facilities for graduate training of personnel entering the public health field; and it is becoming the exception rather than the rule to find untrained individuals directing technical functions in our state health departments. Perhaps this is, of all factors, the most important, for, though statistical interpretation of its value is not possible, the investment is in intellectual values which, obviously, determine all trends.

Another evidence of the movement toward an increasing specificity of objectives is the tendency toward definite planning of programs in both their major and minor strategy and toward subsequent analysis of results. In other words, there seems to be a tendency to the adoption of a controlled experimental approach with objective appraisal of results for the purpose of increasing the specificity and effectiveness of methods. In connection with

this trend, there has developed not only the method of appraisal in local health activity but deliberately planned experimentation in methods for the application of existing knowledge has been executed on a scale not hitherto attempted.

In the light of these facts as evidence of an increasingly excellent professional and technical approach to state departmental administration, can we doubt that our practice will become increasingly effective?

Reference has been made to the interrelationship and interdependence of the health organizations of the several elements of government. A third encouraging trend to better health service for the country as a whole is indicated by the evidence of increasing interest on the part of state health departments in local health departments, especially in rural health organizations which constitutes the weakest link in our chain of facilities for public protection. Less than 600 of our counties are protected by health departments organized on a whole-time basis; yet even this is an improvement over the situation in 1926 at which time only 307 counties were so organized. This progress is unimpressive if attained in spite of difficulties, but it is a courageous achievement which at least indicates the courage any but the timid can bring to bear. The interest of the state in health is shown by the increasing expenditures from their budgets to the improvement and maintenance of rural health. In 1929, \$1,153,072.00 was with-
held by state governments in cooperation with local organizations, and this sum represented nearly 15 per cent of the total expenditures of some 501 health departments.
In the foregoing discussion I have cited 3 trends which indicate the general character of health organization which with single exceptions seem to be pursued

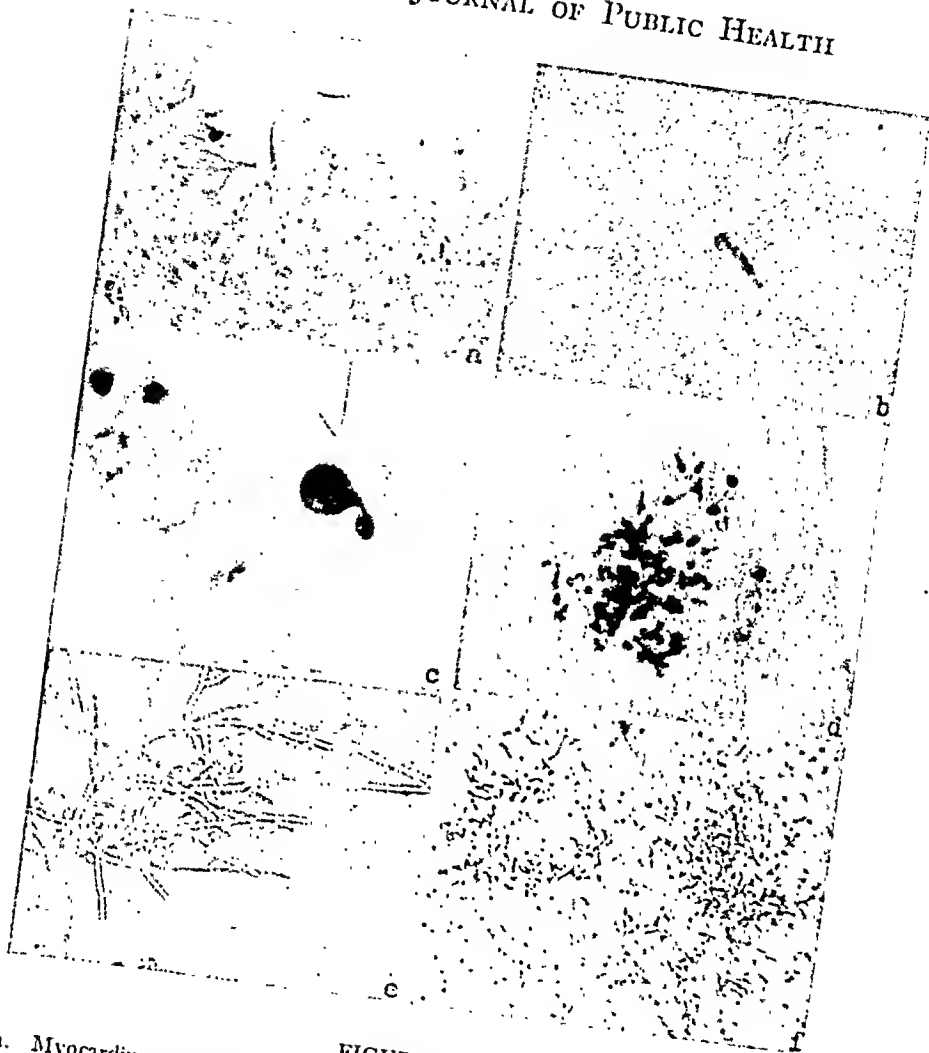


FIGURE II

- a. Myocardium of rabbit inoculated intravenously with 25 million *M. albicans* cells. Killed on the 5th day.
- b. Early formation of a mycelium with terminal conidia in the intertubular capillary of the kidney. Rabbit killed 4 hours after intravenous inoculation with *M. albicans*. Gram stain.
- c. Budding *M. albicans* in alveolar wall of a rabbit's lung. Gram stain.
- d. *M. albicans* lesion in gall-bladder wall of a rabbit inoculated intravenously. Budding cells and elongated forms. Gram stain.
- e. Bile aspirated from the gall-bladder of a rabbit inoculated with *M. albicans* into the left kidney. Luxuriant growth of mycelia.
- f. Budding cells and mycelia in brain lesion. Rabbit inoculated with *M. albicans* locally into left kidney. Died on 4th day. Gram stain.

skeletal muscle (Figure 1b), brain (Figure II,f) and spleen and lungs. The striking thing is that in spite of this widespread manifestation of infectivity of this organism the liver rarely showed lesions. This organ appears to be

highly resistant to infection although the gall bladder often was the site of abscesses (Figure II,d) and the bile nearly always contained abundant yeast-like cells and much long mycelium (Figure II,e).

The intensity of the reaction was revealed more clearly in the kidneys and lungs. The kidneys were 2 to 2½ times normal size, the capsule was tense and the surface appeared greyish white and granular, due to numerous pinhead to pinpoint size abscesses (Figure I,a). The cut surface showed the cortex to be markedly thickened and whitish in appearance due to numerous small abscesses. The medulla was deeply congested and contained only a few small abscesses (Figure I,b).

The lungs were characterized by numerous sub-pleural petechial hemorrhages (Figure I,c). The cut surface also showed some small hemorrhagic spots and thrombosis of the large vessels was occasionally seen; 8 per cent of these animals died of pulmonary thrombosis.

The lesions produced by *M. candida* were so much fewer and less intense in reaction that after a few post-mortems we could distinguish the species of organism with which the animal had been inoculated without consulting our notes.

The lungs revealed in the case of the *M. candida* animals relatively few sub-pleural hemorrhages (Figure I,c) and the kidneys showed no increase in size; the surface contained only an occasional small abscess (Figure I,a). The cut surface revealed a cortex which was not thickened and contained only an occasional small wedge-shaped grey-

ish-white area which extended through the medulla (Figure I,e). The medulla contained a few greyish-white areas but did not appear congested. No other tissues or organs contained lesions.

From this description of the gross pathology one cannot escape the strong suggestion that the process is primarily thrombotic, but that it is purely thrombotic does not seem likely. For instance, why do the arterioles of the glomeruli of the kidney collect the fungus cells in the case of *M. albicans* and not those of *M. parapsilosis* or *M. candida*? Why does *M. albicans* produce lesions in the arterioles of the skeletal muscles and the other 2 do not? Why do the capillaries of the liver escape the plugging effect of even *albicans*? These questions we undertook to answer by a determination of the relative size of the cells of organisms of the 3 groups, and by a determination of the growth capacity of the 3 species within the animal body. The result of determination of the size of the cells is shown in Table II.

It is apparent that there is not sufficient variation in the size of the cells to explain the difference in the species virulence. While it is true that *M. parapsilosis* has cells which average slightly smaller than either *albicans* or *candida*, still *candida* has an average cell size larger than *albicans*. It is apparent, therefore, that the difference in the size of the cells does not offer

TABLE II

Type	Culture Number	Largest micra	Smallest micra	Average micra	Total Average micra
I	50858	7.1	2.1	4.5	4.63
	35221	7.1	2.1	4.73	
	38746	6.0	3.2	4.65	
II	4135	12.0	2.8	6.1	6.03
	801	9.7	2.4	6.0	
	33691	9.5	3.1	6.0	
III	750	9.9	3.4	6.4	6.37
	14999	8.7	4.2	6.43	
	23669	11.0	3.0	6.29	

an explanation for the difference in infectivity of the organism and that the process cannot be entirely thrombotic.

To investigate still further the significance of the size of the cells in the pathology of the experimental disease we next made up suspensions of the different species in normal salt solution and killed them with formaldehyde. When they were proven to be dead by culture the cells were again measured and intravenous injections done. This experiment resulted in no illness in any animal and post-mortem examinations revealed no gross lesions. The microscopic examination of these tissues revealed no reactions of even a mild type.

At this point we felt certain that simple thrombosis as an explanation of our post-mortem findings had been ruled out but so far we had no positive explanations to account for the pathology. We now undertook to determine the growth capacity of 3 species in the animal body. We expected that we might be able to accomplish this demonstration by making blood cultures and urine and bile cultures of animals killed at intervals varying from 2 hours following the injection up to 6 days. We expected that if one species showed a greater capacity for reproduction in the blood stream than another, the organism showing the least capacity would disappear from the blood stream first, that urine and bile cultures would show fewer positive results and, further, that Gram stain of the microscopic sections of the tissues would reveal in the case of the most vigorous reproducers more abundant mycelium. Table III illustrates the results.

It is apparent from this table that *M. parapsilosis* died very shortly after introduction into the blood stream; that *M. albicans* remained in the blood stream as viable organisms for a comparatively long time and showed evidence of being able to invade tissue by its appearance in both the urine and bile. The milder property of *M. candida* in these particulars is indicated by the much lessened frequency with which it appeared in the urine and bile and its inability to maintain itself for as long a period in the blood stream. This difference was still further substantiated by the examination of tissue removed at varying intervals following injection. *M. parapsilosis* showed, shortly after inoculation, signs of degeneration by the appearance of Gram-positive bodies in the tissue which were beginning to break up and it was never possible in these tissues to demonstrate either budding forms or mycelium. *M. albicans*, on the other hand, demonstrated vigorous powers of reproduction in the capillaries by the appearance in sections of tissue removed at 2 and 4 hours of many budding forms of Gram-positive fungi and frequent strands of mycelium, and as the disease progressed mycelium became more abundant. (Figure II, b and c.) *M. candida* showed Gram-positive yeast-like cells some of which were budding but it never produced mycelium.

Our next experiments were designed to test the evidence obtained that *M. albicans* alone of these organisms was able to invade tissue. Animals were injected subcutaneously, intra-muscularly, intra-pleurally, and into the nasal

TABLE III

	<i>M. parapsilosis</i>	<i>M. albicans</i>	<i>M. candida</i>
Syphilis	None	Always	Rarely
Blood cultures	Positive up to 13 hours	Positive 2 to 4 days	Positive up to 36 hours
Urine cultures	Negative throughout	Positive 95%	Positive 35%
Bile cultures	Negative	Positive 50%	Positive 2%

TABLE IV

<i>Number</i>	<i>Source</i>	<i>Clinical Description of Case and Remarks</i>
<i>Type I M. parapsilosis</i>		
35221	Sputum	Mild but persistent bronchitis. Sputum repeatedly negative for tubercle bacilli. Wassermann negative. No further report.
38746	Sputum	Male, age 40, farmer; lost 15 lb. weight; sick 3 years; 2 oz. of sputum in 24 hours. Wassermann negative; sputum negative for tubercle bacilli. Died. No autopsy.
M. parapsilosis 50858	Sputum	Furnished by J. H. Lamb, Johns Hopkins University, Department of Pathology. Male, age 36, a laborer. Four months before pulmonary symptoms had ringworm on cheek; sick 2 years; X-ray diagnosis: interlobar empyema or abscess. Reported year later blastomycosis from another laboratory. Sputum negative; Wassermann negative. Recovered.
36255	Sputum	Chronic bronchitis. No response to inquiry about patient.
<i>Type II M. albicans</i>		
33691	Sputum	Male, age 45, sick 2 months; sputum negative for tubercle bacilli; severe cough; large ulcer on soft palate, upper and lower lip; fungus in sputum, and fluid from ulcers on lips; dullness over lower right chest posteriorly and anteriorly. Died. No autopsy.
22353	Sputum	Male, age 35, mild bronchitis with elevation of temperature for 2 months. Recovered.
4135	American Type Culture	M. pseudo-tropicalis Castellani.
2112	American Type Culture	M. albicans; Natl. Coll. Type Cul., Lister Institute, 714. Isolated by Craik from case of thrush.
2117	American Type Culture	M. psilosis Ashford. Natl. Coll. Type Culture Lister Inst. From J. T. Duncan, London School for Trop. Medicine. Isolated from feces of acute case of sprue.
<i>Type III M. candida</i>		
23669	Sputum	No record of patient.
14999	Buccal mucosa	Membrane covered the mucosa of the cheek, gums and lips to the edge of the skin. Thrush. Patient anemic; membrane present 1 year.
2113	American Type Culture	M. candida Bonorden. Natl. Coll. Type cultures; Lister Institute, 922, Tanner Collection.
1369	American Type Culture	C. Neuberg, Berlin, Germany (Bonorden Handb., p. 76, Fig. 86, 1857) Thom and Church collection, 4472-2.
750	American Type Culture	M. tropicalis Castellani; Aldo Castellani, Tulane Univ., isolated 1909.

accessory sinuses with standard doses, already described, of *M. albicans* and *M. candida*. *M. parapsilosis* was not used in these experiments since it had been shown that even in large intravenous doses it had no pathogenicity.

The subcutaneous inoculations of *M. albicans* cultures resulted in abscesses which healed in 10 to 12 weeks. The injections into muscle, pleura, and nasal sinuses resulted in septicemia and multiple lesions throughout the body, particularly the kidneys.

M. candida cultures produced by these methods of injection neither local nor general reactions.

The cultures used in these experiments are described in Table IV.

We selected these cultures because of their association with certain clinical manifestations in human cases and because some of them are well known in the literature. The classification as *M. parapsilosis*, *M. albicans* and *M. candida* is our own and was arrived at by methods previously described. As already indicated under the discussion of dosage arrived at by cell counts in a hemocytometer, individual cultures of *M. albicans* vary somewhat in virulence but never so much as to be at all confusing with the other species of lower virulence, *M. candida* or with *M. parapsilosis*, which showed no pathogenicity for rabbits. We made no attempt to step up virulence by animal passage before using the culture in an experiment. It is apparent that some of these cultures have been cultivated on artificial media for many years; i.e., culture No. 4135, American Type Culture Collection, *M. pseudo-tropicalis* Castellani, was one of the most virulent cultures we used; killing in smaller doses and causing more widespread lesions when

inoculated locally into various tissues. Our own cultures had been on artificial media for 5 or 6 years without animal passage.

SUMMARY

In our experience, and from what we can get from the literature, *M. albicans* appears to be the organism most frequently associated with human cases of moniliasis. Many organisms described as different species of monilia have in our hands proved to be cultures of *M. albicans*. The animal experiments reported in this paper demonstrate that organisms belonging to the species of which *M. albicans* is typical are the only ones which can multiply vigorously in the animal body and invade tissue. Although the organisms of which *M. candida* is typical have shown some feeble power of reproduction in the animal body they have demonstrated a very low degree of virulence, and this no doubt accounts for the frequency of *M. albicans* in the case reports found in the literature. Organisms of the *M. parapsilosis* species have shown no pathogenicity for rabbits.

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Vitamin G Deficiency*

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GOLDBERGER and Lillie¹ were the first investigators to describe the pathological condition in the rat due to a deficiency of what is now termed vitamin G (B₂). They observed the following symptoms as characteristic of a deficiency of the newly discovered vitamin, then only recently differentiated from vitamin B: arrest of growth, sticking together of the eyelids with an accumulation of dried secretion on the lid margins, and loss of hair from various parts of the body which sometimes resulted in nearly complete denudation. Some of the animals later developed a dermatitis on one or more of the following sites: ears, neck, chest, legs, or paws. Some animals showed a linear fissuring or ulceration of the angles of the mouth and a lesion on the tip of the tongue.

Other laboratories^{2, 3, 4, 5, 6} soon confirmed the general findings reported by Goldberger and Lillie.

Several years ago, we observed that, in addition to the symptoms previously reported, young rats given a vitamin G deficient diet developed a whitish appearance of the eyeball in a large percentage of cases. Examination with the ophthalmoscope revealed the presence of keratitis (opacities in the cornea) and cataract, and histological sections of such eyes confirmed the diagnosis.⁷ Using our dietary regimen, two other

laboratories^{8, 9} have obtained similar results. In order to determine whether this new deficiency manifestation was peculiar to the rat or general for all species, we extended our experiments to mice¹⁰ and chicks¹¹ and have found cataract resulting from vitamin withdrawal. We are now obtaining similar results with monkeys.

Cataract is any opacity of the lens of the eye or of the lens capsule. In order to make subsequent discussion clear I give briefly the anatomy and pathology of the lens. It is a biconvex transparent body, the function of which is to focus the image of objects upon the retina. The capsule is a homogeneous transparent membrane which covers the entire surface. The lens proper is built up of long, transparent, ribbon-like or prismatic bodies known as lens fibers. Each lens fiber is disposed along a meridian of the lens, and extends from its anterior to its posterior hemisphere. In addition, the lens contains a layer of cells over its anterior surface and just under the capsule—the lens epithelium. These are the only cells capable of regeneration. Their function is to lay down successive layers of lens fibers during growth. Mechanical injury, certain diseases, and some toxic materials cause opacities. The lens is non-vascular, and obtains nutriment by diffusion from the aqueous humor, which lies anteriorly, and is in direct contact with the lens capsule.

Aside from inflammatory changes that may occur only when the capsule is broken, the pathological changes pos-

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sible within the lens are extremely limited. Friedenwald¹² classifies these as follows:

1. Sclerosis of the lens fibers, which in extreme cases causes impairment of vision.
2. Autolysis of lens fibers, characterized at first by shrinkage of the fibers with the formation of fluid filled clefts, and later by swelling and digestion of fibers, with the formation of amorphous or crystalline precipitates, which, together with fragments of unaltered lens fibers suspended in a fluid of high protein content transmit light very poorly.
3. Proliferation of the anterior lens epithelium, which sometimes forms a dense membrane many cells deep.

The cataracts we have found resulting from vitamin G withdrawal have been characterized in histological section by the two latter changes, that is, autolysis of lens fibers, and proliferation of the lens epithelium (Figure I).

These nutritional cataracts have been prevented by yeast, autoclaved yeast, liver, kidney, and other meats, milk powder, and a wide variety of other foods containing vitamin G. In fact, wherever definite growth has been obtained in a vitamin G assay, cataract

has failed to appear. Wherever rats have failed to grow in a vitamin assay, as in negative controls or in animals which received foods deficient in vitamin G, cataract has developed. It appears, therefore, that for our strain of rats, stock diet, method of care, and deficient diet, the growth promoting vitamin that we are dealing with is the same as the cataract preventive vitamin.

The feeding of a vitamin rich diet to animals which have developed the disease results in a gradual clearing up of all the general and ocular manifestations except the cataract. The opacities in the cornea tend gradually to disappear. New hair appears on the eyelids, the animal in general puts on a new coat of hair, and develops an apparently normal health and vigor. The lens opacities do not disappear, however, as there is no mechanism for the repair of damaged lens fibers (Figure III).

Numerous investigators have observed an ophthalmia as one of the characteristic signs of vitamin G deficiency in the rat.^{1, 2, 3, 4, 5, 6} Of all these investi-

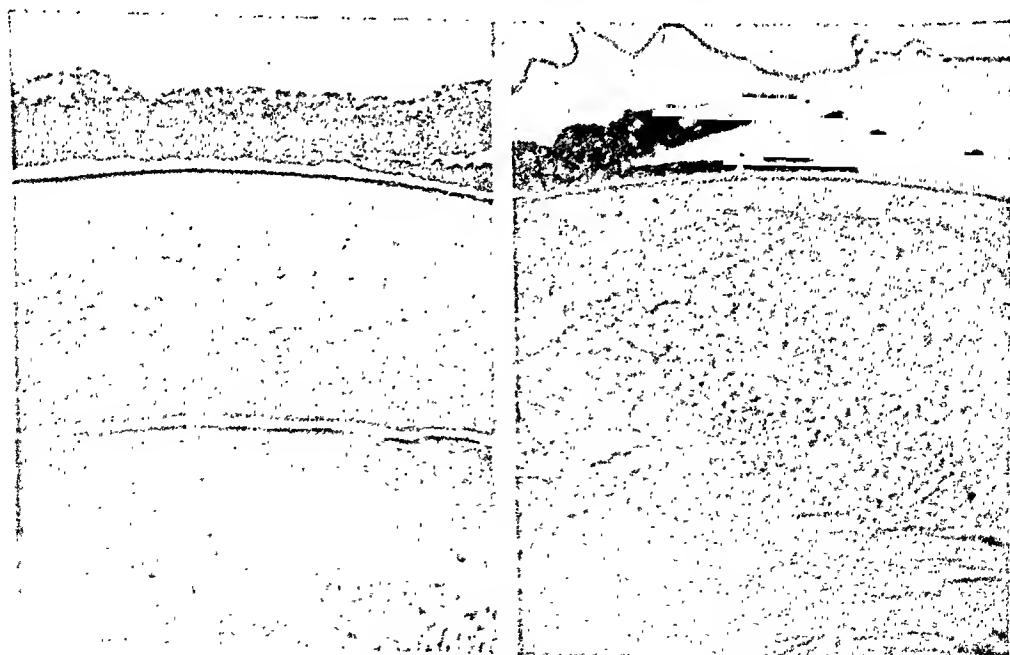


FIGURE I.—Microphotographs of sections of normal and cataractous lenses of Norway rats. A.—Normal lens; B.—Cataract resulting from vitamin G deficiency.



Courtesy of the *Southern Medical Journal*

FIGURE II—Photograph of a Norway rat showing cataract resulting from vitamin G deficiency.

gators, Salmon, Hays, and Guerrant³ alone mentioned an opacity of the eyeball. They believed, however, that the opacity centered in the vitreous humor but sometimes invaded the lens.

The question arises: why, if cataract is such a constant accompaniment of vitamin G deficiency, has it not been observed more generally? There are probably several reasons. Even under the most favorable conditions for the appearance of lens changes, *gross* cataract frequently does not appear until after the 70th day. Consequently, if the animals were kept for an 8 or 10 week period only, the cataract might easily be overlooked. Before the gross manifestations of cataract appear, there is frequently a sticky exudate which seals the lids, and only by forcing them open does the cataract appear, so it might easily go unnoticed unless one were looking especially for it. It is also quite possible that in other laboratories, because of different nutritional history, different vitamin deficient diets, and with other methods of care, rats do not develop cataract on G-deficient diet.

As we have been using cataract as a

criterion of vitamin G deficiency in our negative controls, we have naturally chosen those conditions of diet, age and size of animals, size of litters, etc., which would produce cataract with the most regularity and at the earliest age. Therefore, it is not surprising that we have found and reported cataract in a higher percentage of cases than have other laboratories. It is possible that with our experimental regimen we are dealing with one deficiency, and laboratories that have not observed cataract are dealing with a deficiency of some other vitamin.

Are these experimental cataracts due to lack of vitamin G, or some other vitamin? This may depend upon the definition of vitamin G accepted. The cataract preventive vitamin is stable to autoclaving, is soluble in water and dilute alcohol, and insoluble in strong alcohol. The cataract results from a deficiency of vitamin G then, if vitamin G is defined as the relatively heat-stable water—and dilute alcohol-soluble vitamin or vitamins. To those who limit the use of "G" to denote the dermatitis preventive factor, cataract may or may not be due to vitamin G deficiency. Superficially considered, it might seem improbable that the dermatitis preventive factor and cataract preventive factor could be identical. On more careful consideration, however, it seems not only possible but quite probable. The lens is derived embryologically as an invagination of the body-wall ectoderm, and thus is derived from the same germ layer as the skin. Friedenwald says: "The structures most nearly related to it are the hair and the nails."¹² It is therefore not unreasonable to suppose that a deficiency which results in changes in the skin might also produce pathological changes in the lens. It seems that vitamin G deficiency affects chiefly tissues of ectodermal (body-wall) origin: skin,

lining of the mouth, conjunctiva, cornea, and lens.

Although it appears quite probable that both dermatitis and cataract are due to the same deficiency, there is the possibility that cataract and the other ocular changes result from a deprivation of one of the newer and less well known vitamins, of which there appear to be several. Harris,¹³ in 1931, listed 17 new factors of the vitamin B group reported up to that time, and several similar reports have appeared since.

It would appear that, in working with the multiplicity of factors in the vitamin B complex, investigators have given more attention to evidence based upon growth than to that based upon pathological manifestations. Growth can be accurately measured, averaged, and the results statistically analyzed, while it is difficult to give a quantitative statement of the degree of pathological change, such as the extent of dermatitis. For this and other reasons, much of the evidence for the existence of the many new vitamins is based upon growth alone. Chick and Copping¹⁴ recognized this in 1930:

Much difficulty and uncertainty in this field of work is due to the fact that, except in work on the antineuritic vitamin B₁ and to some extent in that on the antidermatitis vitamin B₂, the criterion for presence or absence of these various B vitamins has been the growth (increase in weight) of a rat or pigeon. . . . Advance in this field of work would be much helped if the physiological rôle of the various members of the group were elucidated and the pathological condition following deprivation recognized.

For this reason alone I feel that the cataract which results from a deficiency of a relatively heat-stable vitamin deserves the attention of workers in this field. If cataract results from a deficiency of one of the new vitamins, it is a definite and unmistakable sign to be looked for as evidence of such deficiency. If cataract and keratitis result from the same deficiency as dermatitis, we have another and perhaps better criterion of the deficiency. In fact, dermatitis would seem to be an unsatisfactory evidence of vitamin G deficiency, since Sherman and Sandels⁵ found that it occurred more frequently when there was a small amount of vitamin G present in the diet.



Courtesy of the American Journal of Ophthalmology

FIGURE III. Photograph of an albino rat showing cataract in the left eye as a result of vitamin G deficiency. In this case cataract developed in the left eye first, after which time vitamin G was added to the diet, preventing the development of cataract in the right eye.

In a large series of animals which we have recently followed by weekly ophthalmoscopic examinations,¹¹ keratitis and cataract were the *first* pathological signs observed, excepting alopecia. In some cases cataract preceded the loss of hair. It is quite probable that there were changes in the skin coincident with the changes in the cornea and lens, but due to the structure of the skin, pathological manifestations are not readily evident until far advanced. On the other hand, the lens is a transparent tissue in which very early changes can be seen with the ophthalmoscope without injury to the animal, and with which the daily or weekly progress of the disease can be followed closely.

In order to make pathological records of skin changes comparable to those we keep on rats' eyes, it would be necessary to kill representative animals at weekly intervals, fix and section portions of the skin, and examine with a microscope. In proposing the ophthalmoscope as a new tool for the vitamin biochemist we are suggesting a technique that is simple and rapid.

Good ophthalmoscopes, entirely satisfactory for animal work, are obtainable at less than half the price of an ordinary microscope. A few weeks' experience will enable the research worker to distinguish the various stages in the pathology of the cornea and lens of experimental rats on vitamin G deficient diet.

What is the application of these experimental findings to human cataract? We are becoming increasingly confident that cataract may be expected wherever there is an inadequate intake of vitamin G. All animals with which we have experimented, from chicks to monkeys, have developed cataract as a result of such a deficiency. If man does not, he would appear to be the exception. As the human requirement for vitamin G is not known, it is impossible to state

whether any given human dietaries are deficient enough in this factor to produce cataract.

Clinical cataract results from a number of causes. Two types—congenital and so-called senile—are of obscure etiology. It would seem possible that at least some of these so-called senile cataracts might be the result of vitamin G deprivation. The general appearance of the rat given a subnormal amount of vitamin G, Sherman¹⁵ describes as a picture of "premature senility." He says: ". . . so a liberal intake of vitamin G contributes to a better than average nutritional condition and thus to what McCollum and Simmonds have aptly termed 'the preservation of the characteristics of youth.'" Sherman and Smith¹⁶ state: "The significant improvement in longevity found by Sherman and Campbell resulting from improving a diet already adequate . . . is probably due in part to the higher content of vitamin G. . . ." With such observations upon the picture of premature old age resulting from vitamin G deficiency, and the preservation of youth and increased length of life resulting from a liberal intake of vitamin G, it is possible to make out a plausible case for a possible relationship between vitamin G deficiency and senile cataract. Friedenwald says: "(senile) cataracts may, then, be related to the falling out and blanching of the hairs and to other similar senile changes in epidermal organs."¹² In the light of this statement it seems more than a coincidence that, in our experimental animals, we find a falling of hair and early cataractous changes occurring almost simultaneously.

A discussion of cataract and vitamin G deficiency would not be complete without mentioning pellagra. Cataract does not appear to be any more prevalent among pellagrins than among non-pellagrins of the same age, occupation,

and social class. If experimental cataract is the result of a deficiency of the dermatitis preventive vitamin *per se*, this would argue against the identity of the pellagra preventive and the rat dermatitis preventive factors. It is possible, of course, that pellagra and cataract both result from the same deficiency under slightly different conditions. It may be that pellagra results from a partial deficiency, while cataract results from a more complete deprivation of the same vitamin. A somewhat analogous condition is met with in our experimental animals; diets free enough of vitamin G to produce cataract do not cause the ulcerative type of dermatitis. Under these conditions alopecia is about the only consistent evidence of dermatitis. With less complete freedom from vitamin G, distinct scabby ulcers appear on the skin, but the development of cataract is greatly delayed (Cf. Sherman and Sandels⁵).

In discussing the bearing of the cataract of vitamin G deficiency upon the etiology of pellagra, it is premature to do more than suggest possibilities. Although cataract as a symptom of G-avitaminosis seems to add one more unanswered question to the pellagra problem, it is hoped that it will ultimately aid in the elucidation of this important question.

Although vitamin G withdrawal does not result in such rapid and dramatic changes as some other deficiencies, such as in the case of vitamin A, a deficiency that results in such marked and *irreversible* damage to such a highly

specialized tissue as the lens, should not be considered lightly.

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Child's Sleep—Effect of Certain Foods and Beverages on Sleep Motility^{*}

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THE importance of diet both in the treatment of disease and in its prophylaxis is now commonly accepted. The advances made in this field in the deficiency diseases, the vitamins, the anemias, and arthritis, reflect but a few of the problems under investigation. What further etiological factors of disease will be traced to faulty diet and dietary habits is a matter of interesting speculation.

We have attempted a study of a very homely problem. What is the effect of various foods and beverages on sleep? This problem has been of particular interest to us as to its effects on children. When should the school child eat its heaviest meal—at noon or at night? Certainly in the average American home the heaviest meal is served in the evening between 6 and 7 p.m. In most instances the school child has been put to bed within 2 hours after this meal is completed. What effect, if any, does this have on the child's sleep? In many homes immediately before retiring the child (and frequently the adults too) will take some food—a glass of milk or orange juice or a plate of ice cream. What effect does this bedtime food or drink have on the child's sleep? Many have speculated, both advocating and condemning this practice, but, so far as the literature reveals, there has

been no rigid investigation to give an answer. Our sleep studies were begun nearly two years ago at an isolated school in the mountains of North Georgia. These studies are still in the process of completion and this paper is in the nature of a preliminary report. We have used 42 children in making the study, varying in age between 9 and 14 years. The children are equally divided as to sex. So far, we have graphic records of about 90,000 hours of sleep under controlled conditions.

Each child that is used as a subject is examined physically and such laboratory tests as basal metabolism, electrocardiogram, urinalysis, blood count, and examination of stool for intestinal parasites, are made. Children with organic defects were not accepted. Those showing remediable conditions, such as diseased tonsils, teeth, hookworm, and the like, were treated and then admitted. We made every effort to be sure we were dealing with normal children. On account of the isolated location of the sleep laboratory, such extraneous influences as automobiles, street cars, and trains did not constitute a problem. The sleep laboratory itself consisted of two very large halls, each amply accommodating 12 beds—one hall for males and one for females. Beds, springs, mattresses, pillows, and bed clothing were identical for each child. The amount of bed covering was determined, on retiring, by the nurse in

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charge. The children retired each night at 8:30 and arose at 5:30 a.m. Care was taken that all retired at the same minute and lounging on the bed before this time was not allowed.

During the first 3 months of this investigation, as has been previously reported,* the children were observed at 15 minute intervals by the nurses to determine how they were sleeping. It seemed to us that change of position might be used as an index to the character of the child's sleep. For recording this we devised a form using symbols for the various body positions so that the nurses might rapidly fill this in as rounds were made, and the total number of changes of position computed the following morning, thus determining whether or not the child had had a normal or a restless night. It is evident that in using this method of observation only gross changes of position could be determined, that many minor muscular movements occurring under the cover eluded detection. For this reason in September, 1932, we changed to the electrically recording hypnograph.

METHOD AND APPARATUS FOR RECORDING SLEEP MOVEMENTS

The machine which we are using for recording sleep was originally described by Renshaw and Weiss.¹ In brief, the principle involved is as follows: The bed mechanism attached to the bed-spring consists of a perpendicular piece of metal containing alternate inserts of bakelite and brass. A small brass wheel travels up and down this piece which makes or breaks an electric contact with the slightest movement of the individual occupying the bed. This contact is conducted through cables into an adjoining room in which is placed the hypnograph itself. The hypnograph consists of a

battery of 24 stylus pens (one for each bed) which write upon a uniformly travelling roll of paper, 8 inches broad. Two colors of ink are used in the pens, one for the males and another for the females. As this paper passes under the pens it is stamped electrically by a timer at 1 minute intervals, so that at the end of a night's observations this can be ruled out 60 minutes to the hour and each body movement accurately recorded, minute by minute, for the entire 9 hours, or 540 minutes, that the child is in bed. As the contacts are made or broken by the bed mechanism, electro-magnets on each pen of the hypnograph make offsets from the base line on the record. Beside the hypnograph are relay boxes so arranged that if the circuit through any bed ceases functioning properly, the signal lamp will light and remaining burning until the condition is corrected. Thus should an individual leave his bed for any purpose during the night, the relay lamp will at once notify the operator of this fact.

At the end of each night's observations the active minutes, that is, any minute during which a sleeper makes any movement, are counted, hour by hour, and recorded for each of the 24 individuals, the total number of active minutes being entered at the end of the night. From this record the observations are copied daily onto the individual's record.

That we may properly evaluate the measurement of sleep movement as an index to the depth of sleep, let us review briefly the results of some prior investigations.

Kohlschutter² some 70 years ago, using auditory stimuli, showed that the depth of sleep was reached quite early in the night. Later this was confirmed by Michelson.³ These observations and ours seem in general to agree, as certainly in children, at least, sleep is more quiet in the second 30 to 60 minutes after

* Read before the Section on Pediatrics at the Eighty-fourth Annual Session of the American Medical Association, Milwaukee, June, 1933.

a child has retired than at any other part of the night. Canestrini⁴ observed as a criterion of awakening slight movements and changes in the type of breathing. Kussmaul⁵ showed that, in young infants, stimulation by light caused a tightening of the eye lids. Using this as a confirmatory index of the depth of sleep, Renshaw⁶ has recently shown that immediately before and immediately after body movement, the amount of light stimulation necessary to cause lid tightening was very much less than when no sleep movements were present. It is an assumption, therefore, that the depth of sleep is immeasurably lighter at the time that a movement is made. Further work is in progress on this point.

NORMAL SLEEP PATTERN

In an attempt to arrive at what constitutes the normal sleep pattern we used 15 consecutive nights in which the 24 children had followed their normal daily routine. This normal sleep pattern which we used is based on a study of 3,240 hours of normal sleep. Considering the children from an individual standpoint, we can say that, except in a very general way, no two children have the same sleep curve. The first hour in bed is the most active hour and the next most active hour is the last regular hour of sleep. In a vast majority of children the quietest sleep is reached the second 30 to 60 minutes after going to bed. As a concrete example, if a child retires at 8:30 p.m. and arises at 5:30 a.m., it will show more restlessness—more active minutes—between 8:30 and 9:30 p.m. and 4:30 and 5:30 a.m., than in any other 2 hours of the night. Aside from this, generalities cease, and what may be quite normal for one child, may be distinctly abnormal for the second child, assuming both to be normal children. These facts apply equally to males and females.

The graphs presented are plotted on ratio paper. We believe that the trend may be more readily seen by using this method. The hours of sleep are listed at the top of the graph with a scale showing the active number of minutes to the left of the graph: the lower limb of the graph shows the body movements, hour by hour, of the child or children under observation and the upper limb of the graph is a summation of the minute movements throughout the night. The resultant curve we refer to as the child's sleep pattern. Once established this curve rarely varies except with the seasons or the introduction of experimental conditions. We have observed that, as a sex, females are sounder sleepers than males, not only do they get to sleep more quickly, but sleep more quietly throughout the night.

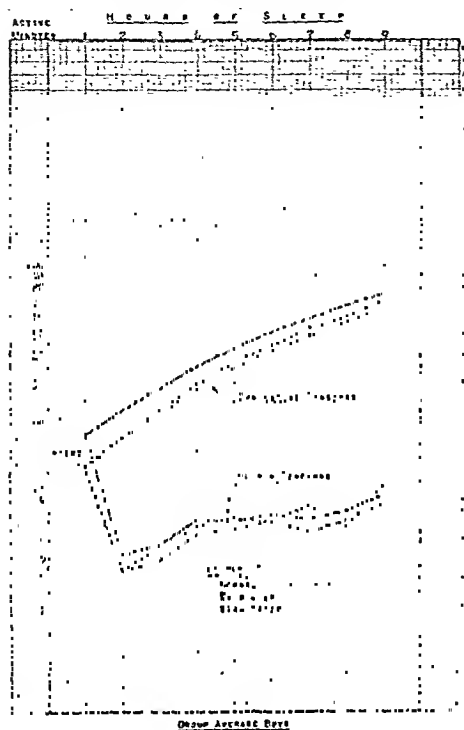
THE EFFECT OF CERTAIN BEVERAGES ON SLEEP

Among other studies made we have collected certain data on the effect of cold water, cold milk, warm water, warm milk, a cold beverage containing 0.6 gr. caffeine, and orange juice. We will present on graphs the group averages both on boys and on girls. Twelve children, equally divided as to sex, were used in each experiment.

It has long been thought that the drinking of certain beverages at bedtime might induce sleep. The administration of a glass of warm milk to neurasthenics on retiring has long been a therapeutic practice. If this beverage does induce sleep, would not the ingestion of the same amount of warm water at the same temperature produce the same result. In each experiment cited the beverage was given at 8:15 p.m. and the children were in bed and the lights out at 8:30. Each experiment was done on 5 consecutive nights. Figure I shows the group average for the boys.

FIGURE I

SHOWING EFFECT OF WARM MILK AND WARM WATER ON SLEEP PATTERN



In making an estimate of the significance of the results obtained it seemed wise to adopt the biometric method which is widely used, namely, that of determining the probable error. In explanation of the meaning of the probable error, it may be stated that it has long been a universal custom among biometric workers that the difference (or constant) which is smaller than twice its probable error is probably not significant, whereas the difference (or constant) which is three or more times its probable error is either "certainly" or at least "almost certainly" significant.⁷

In the case of the warm water experiment, the difference in the number of movements, before and after the experiment, was less than three times the probable error in 8.3 per cent of the children, was greater in the same per-

centage of the children and was less than twice the probable error in 83.3 per cent of the children, which, we assume, tends to show that in 83.3 per cent of the children the drinking of warm water on retiring had no effect whatsoever. On the nights on which the warm milk was received, it was seen that in 41.7 per cent of the children the activity was diminished; the movement was increased in 8.3 per cent of the children and in 50 per cent of the children there was no change noted. Thus, 41.7 per cent of the children slept definitely more quietly after the warm milk. A further experiment was done on 12 children, each receiving 6 oz. of cold water upon retiring for 5 consecutive nights. On the nights in which the cold water was received there was a decrease in 16.7 per cent of the children, an increase in 25 per cent of the children and in 58.3 per cent of the children there was no effect noted. This experiment was compared with the ingestion of cold milk on retiring for 5 consecutive nights to the same number of children. From a study of the results obtained it can be seen that from the standpoint of the probable error in 16.7 per cent of the children the activity was diminished; movement was increased in 8.3 per cent of the children and in 75 per cent of the children no change was noted whatsoever.

A concluding experiment was done in which 12 normal children received 6 oz. of a cold caffeine containing beverage on consecutive nights, the beverage containing 20 gm. sucrose and approximately 0.6 gr. caffeine. After determining the probable error on this series, it was shown that there was less activity in none of the children, an increase in 18.2 per cent of the children and in 81.8 per cent there was no effect noted. A companion experiment using 6 ounces of orangeade containing 20 gm. of sucrose was given to 12 normal children on consecutive nights. Deduc-

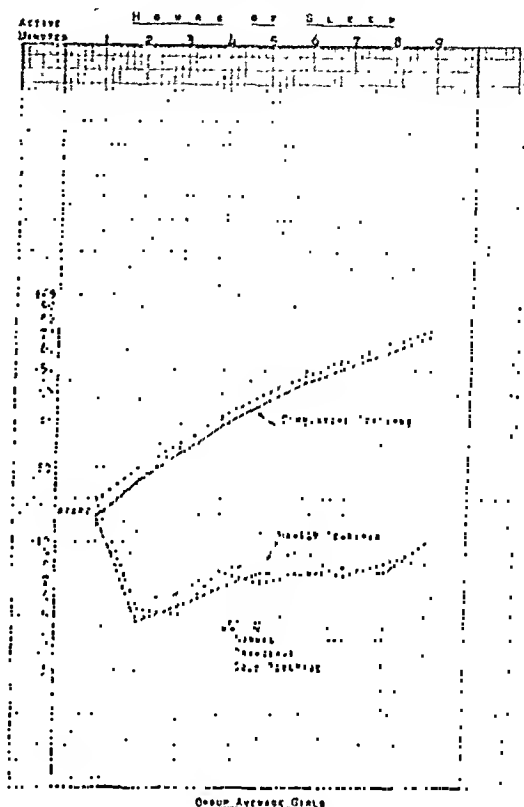
tions after determining the probable error on this series showed there was less activity in none of the children, an increased activity in 18.2 per cent of the children and in 81.8 per cent there was no effect noted whatsoever. Figure II shows the group averages for girls.

It is rather difficult to interpret these results properly. At the present time we have under way experiments collecting more data on these points. It seems fair to conclude, however, from the information we have now on hand that the administration of warm milk on retiring, which has been so long an empirical basis, is really effective. That this effect cannot be due to the temperature of the drink was shown by the fact that no such results were noted when warm water was substituted. That this was not due to the milk alone is shown by the fact that when milk was given cold, the results did not even approximate those obtained when given warm. It is assumed, therefore, that the warm milk effect must be a combination of both factors, that is, easily digestible and assimilable food given at a temperature approaching that of the body. Certainly, the administration of the other beverages named in no way seems to promote appreciably or to prevent sleep.

THE EFFECT OF FOOD ON CHILD'S SLEEP

This experiment was done on a series of 24 children in order to determine what might be the effect on sleep of the taking of various types of evening meals. Three types of meals were used, first, a normal meal which consisted of a fruit, cereal or eggs, and bread and butter and milk; second, a very heavy meal made up of first a fruit, then a meat such as steak or turkey, several vegetables, including green and starchy, dessert, such as pie or ice cream, and 1 oz. of candy to each child; third, a very light meal con-

FIGURE II
SHOWING EFFECT OF ORANGEADE AND COLD
CAFFEINE CONTAINING BEVERAGE ON
SLEEP PATTERN



sisting of simply a slice of bread and butter and a glass of milk. The evening meal was served always at 6:30 p.m. and the children retired at the usual hour of 8:30 p.m. From a study of these experiments with the heavy meal, sleep motility was found to be definitely increased in 23 out of the 24 children. The group average for girls is shown in Figure III.

As regards the light meal in comparison with the normal supper, it will be noted there was very little, if any, difference. On the average, the children went to sleep just as quickly with a light meal as they did with a normal meal and their general sleep movement throughout the night was practically unchanged. In the case of the heavy meals a very high percentage of the children showed a much greater increase

in movement than was seen after any of the beverage experiments. Expressed in terms of the probable error, it was found that after the very light evening meal sleep seemed to be promoted in 25 per cent of the children; restlessness was seen in 8.1 per cent and in 66.7 per cent of the children the meal seemed to have no effect. In the case of the heavy meal, from the standpoint of the probable error, none of the children slept as quietly; there was an increased restlessness in 58.3 per cent of the children and no effect was noted in 41.7 per cent of the children. This restlessness after a heavy evening meal was especially noticeable in the first hour after retiring and on the average extended practically throughout the night. In the case of the girls during only 1 hour did the sleep motility fall to normal, and with the boys, this fall was delayed to the 8th and 9th hour after retiring.

CONCLUSIONS

From the above we may conclude the following:

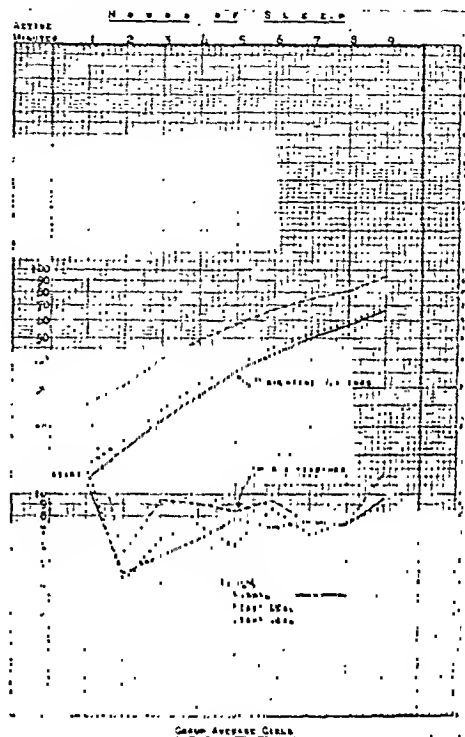
A child has a very definite individual sleep pattern.

The drinking of 6 oz. of warm milk at bedtime seems to produce quiet sleep in normal children.

Of the several other beverages tested none seems to affect sleep consistently. The ingestion of a beverage containing 0.6 gr. caffeine and 20 gm. sucrose proved to be identical in effect with the drinking of 6 oz. of orange juice containing the same amount of sugar.

The eating of a heavy evening meal by children between the ages of 9 and 14 years produces marked rest-

FIGURE III
SHOWING EFFECT OF HEAVY MEAL AND LIGHT MEAL ON SLEEP PATTERN



lessness. In many cases the restlessness continued throughout the night. The eating of a very light evening meal differs in no respect from the sleep seen after a child has eaten its normal supper.

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Relative Values in Tuberculosis Case Finding Work

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NUMEROUS communities have recently undertaken tuberculosis case finding work by the method of making tuberculin tests of school children and examining the positive reactors with the X-ray. Some skepticism as to the value of this method (we shall call it the "tuberculin-X-ray" method in this article) has been voiced because the results are not so "productive" as the older method of confining the examination to contacts of open cases ("contact-examination" method). The two methods should be evaluated from a public health administration standpoint, but it is an error to try to balance one against the other with the idea of selecting one method to the exclusion of the other.

The first necessary step in the control of tuberculosis is the discovery of cases, for each case is a real or potential "carrier." In 1897 Dr. Hermann Biggs secured legislation requiring the registration of all cases of tuberculosis in New York City. This innovation met with bitter opposition but prevailed in the end, and the plan in one form or another has since been adopted by every state in the Union. The theory on which the reporting plan is based is that if all doctors report all cases that come to notice the health department will soon have a complete roster of all carriers of tuberculosis. Reporting is a vast net spread over the community to catch the disseminators of the tubercle bacillus.

In a previous article¹ some of the

many holes in this net were pointed out. One conclusion was that, for the country as a whole, case reporting is less than 50 per cent complete. Even where case reporting is well done quantitatively its full qualitative value is not realized. For example, Plunkett² reported that in 1925, only 24.2 per cent of the tuberculosis cases known to the New York State Health Department were registered 1 year or more before death. To be sure, delayed reports, even those made after death, are valuable because they enable the health department to trace out contacts, but, assuming the infectious period of a case to average about 2 years, the delay in reporting three-fourths of the cases means that many people are exposed to the disease who might be spared that danger if reporting were more prompt.

By examining the contacts of known cases of tuberculosis we discover new cases. The system is like a chain letter, which, if it could be carried on without a break would ultimately reach the entire population. Tuberculosis and chest clinics appreciate the importance of contact examination. It is a tradition among them that when a case of tuberculosis is diagnosed every effort must be made to get all members of the household examined. How efficiently does the plan work in a well conducted clinic?

A study of the effectiveness of contact work was recently made by analyzing the records of the clinic patients of Henry Phipps Institute in

Philadelphia.³ All patients who were diagnosed as tuberculous for the first time during a selected period of 18 months were designated as "original tuberculosis patients." These numbered 182, and the family record of each was reviewed 1 year after the date of diagnosis. This gave a picture of the success of 1 year's attempt to secure the examination of contacts. It was found that there were 647 contacts of which 308 (48 per cent) came to the clinic within the year after the date of diagnosis of the original tuberculosis patient.

Of the 308 contacts who did come for examination, 35 (11 per cent) were found to have tuberculosis. Obviously the contact examination work as carried on by this clinic was "productive"; for a clinic to discover in 1 year 35 cases of hitherto unknown tuberculosis, to say nothing of the more intangible beneficial results, is indeed commendable.

Reducing the above findings to round-number ratios we may say that for each 10 original tuberculosis patients known to the clinic there were: (a) 35 contacts, of whom (b) 17 were persuaded to come for an examination, of whom (c) 2 were found to have tuberculosis.

Excellent as this result is, it leaves much to be desired, judged by standards of administrative efficiency. Since more than half of the contacts failed to come to the clinic for examination, the disquieting question arises, how many of these are tuberculous? If the same ratio holds for them as for the group examined we may infer that for each 10 original tuberculosis patients there are among their contacts at least 2 undiscovered cases of tuberculosis.

Whatever its shortcomings contact-examination work probably exceeds in importance any other single measure in the tuberculosis program. But since it is not inclusive enough to be relied upon

as our sole means of discovering cases, supplementary methods are, to say the least, desirable. One such measure is the routine examination of school children with tuberculin followed by roentgenographs of the positive reactors. The experiences of communities with this method are numerous and essentially similar. One of the latest reports is that of the Chadwick Clinics in Massachusetts.⁴ Among children aged 15 to 19 years who were examined in 17 Massachusetts cities, pulmonary tuberculosis was found in 65 out of each 10,000 who reacted to the tuberculin test and who were X-rayed. This is in the ratio of 1 case per 154 examined by X-ray.

To indict the tuberculin-X-ray method as "unproductive" merely because it discovers only 1 case of tuberculosis out of each 154 X-ray examinations, whereas the yield of contact-examination work is 1 case out of 9 contacts examined, would be superficial and unjust. There are other considerations to be taken into account and other values to be compared, such for example as the relative costs of the two methods, the personnel required, and the equipment needed. Since these differences are at the present time difficult to calculate we may content ourselves with an enumeration of some of the values of the tuberculin-X-ray method.

1. Group tuberculin testing and X-ray examination of the reactors can be systematized so as to entail relatively little labor and expense. (X-rays in groups can be secured for as little as \$.75 per case.)

2. The tuberculin-X-ray method aims not only to discover pulmonary tuberculosis of the adult type among children but also significant lesions of the childhood type. Hetherington⁵ and his associates found significant lesions in 1.0 per cent of white boys 12 to 20 years of age; and 2.3 per cent of white girls of

the same age in a study of school children in Philadelphia. (The authors include in the grouping of "significant lesions" calcified lesions of the lungs or tracheobronchial lymph nodes, which may indicate heavy initial exposure to tubercle bacilli, and caseated lymph nodes, which represent a large tuberculous focus without evidence of healing and which lesions have grave significance until calcification has occurred.)

Generally speaking, the presence of childhood type lesions of whatever stage warrants the tentative presumption that the child has been exposed to mass dosage of tubercle bacilli. For the majority of children with childhood type lesions the serious danger confronting them is not the lesion *per se* but continued exposure if such exists. Until that question has been cleared up and until the contact, if it is established, is broken, the child is to be regarded as being in danger of developing serious tuberculous disease.

3. Discovering tuberculosis in children of the teen age is extremely valuable for it is at that time that the prognosis is most hopeful. The teen age sector is a strategic one because it is in the age period 15-25 that the tuberculosis mortality shows its sharpest rise. To prevent a case of tuberculosis is far better than to discover a case.

4. By means of the tuberculin-X-ray method many cases are discovered which are symptomless. Of 130 pulmonary cases found in the Chadwick Clinics during a 5 year period, only 8 per cent gave definite symptoms, and barely 50 per cent showed either symptoms or physical signs. One of the three main obstacles met in endeavoring to secure contact examinations at the Henry Phipps Clinic is that the contact says he feels well and sees no need for examination.

5. Follow-up work, which is an essential part of the tuberculin-X-ray method, leads the investigator into many

a home where there is an open case of tuberculosis, undiagnosed or masquerading as bronchitis, heart disease, or something else.

Dr. F. E. Harrington,⁶ Commissioner of Health of Minneapolis, states that 26 per cent of the cases of adult type of tuberculosis now registered have come to the department's knowledge through follow-up work originating with infected children discovered in routine tuberculin-X-ray work.

6. The tuberculin-X-ray method has enormous educational value. Those who toil in the field of health education know how great is the inertia of indifference and how difficult it is to arouse interest in the subject of tuberculosis. The dramatic power of "consumption" has largely been lost—for which we should be grateful. Yet the need for understanding and for intelligent action is still great. By what means shall we reawaken interest and create a thirst for knowledge? A well planned project of case finding by the tuberculin-X-ray method breaks down the barriers and opens wide the gates for the education we wish to impart. Merely to ask parental permission to do the tuberculin test raises the question in their minds, "Why should *my* child be tested?" Willingly they come to hear a talk on the subject; eagerly they read the pamphlets offered them. Incidentally, it puts us on our mettle to express simply and truthfully but without creating unfounded fear, what the significance of infection may be. When the child's reaction turns out to be positive, they invite even more pertinent explanation. The commercial advertiser speaks of "breaking down sales resistance" and considers his campaign half won when he succeeds in doing it. Parents who will listen can easily be persuaded to surround the child with safeguards and good home environment, and to utilize the family doctor as health adviser.

Doctors who have given scant attention to tuberculosis are impelled to renew their interest and their knowledge when parents come to them with the child and a report from the school indicating what the tuberculin test and X-ray disclosed. The doctor's interest in the child necessarily embraces the entire family situation. The family becomes the unit of his study. Furthermore, he relates the childhood lesions called to his attention to the broad subject of tuberculosis. For the past 3 years a publication of the National Tuberculosis Association known as *Childhood Type of Tuberculosis* has been in great demand among physicians, which reflects widespread interest in this particular subject.

Through a school tuberculin test survey, teachers and school officials become acquainted with the problem of tuberculosis. Students in the high school are eager to learn about tuberculosis when such tangible evidence as a positive reaction or an X-ray film is before their eyes.

7. Finally, tuberculin test surveys contribute much needed knowledge to our understanding of the perplexing problem of tuberculosis. We sorely need, not only more research into the pathology of tuberculosis but also epidemiological observations made on large numbers of children in different localities, and the base lines now being established by group studies will be invaluable a few years hence when the time factor will have exerted its influence.

SUMMARY

The tuberculin-X-ray method is not a substitute for the tried and tested method of contact examination. On the other hand, contact examinations cannot be expected to reach certain sectors which are successfully explored

by the tuberculin-X-ray method. Both methods have values. But these values cannot well be compared on a basis of relative efficiency. Therefore, both methods should be employed at least until displaced by some better scheme. Where means and facilities are limited it goes without saying that contact examination work should be given precedence—it is the most obvious method to be employed. If possible, tuberculin-X-ray surveys of high school children should be made as a supplement. For those who are able to do still more, elementary school children should be given the benefit of the tuberculin test and the X-ray.

With the continued decline in the incidence and death rates of tuberculosis, the possibilities of reducing it to a controllable minimum grows ever more attainable. Yet, as the fight narrows down, it becomes more technically difficult. We have succeeded thus far in discovering the obvious "carriers." There are still among us a goodly proportion of concealed or unsuspected cases. If the modern search for contacts seems tedious, complicated, and round-about, our justification is that only by reducing the foci of infection to a vanishing point can we hope to achieve protection against this disease in the same measure as we now enjoy protection against yellow fever.

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A Plan to Increase Understanding of the Value of Scientific Medicine *

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THE subject shows a sense of opportunism on the part of the program makers. Let us analyze it—starting at the rear end. After the third reading of it in a quiet darkened room the following break-up into questions emerges:

1. How scientific is medicine?
2. If it is scientific, of course, it has value. But do we want to increase popular understanding of its value?
3. Does the topic mean merely to increase the feeling that it is valuable, or to increase popular knowledge of the facts of medical science?
4. Can we do one without doing the other?
5. Can we do both at the same time?
6. If we can and should increase such understanding how shall we do it?
 - a. With limited funds?
 - b. With ample funds?

How scientific is science?

I asked this question of a doctor. I must have caught him either in a frank and cynical mood, or just after an examination of his bank account; for he declared that if half of the diagnoses made by licensed physicians were correct, that would be a good batting average. I asked the question of a business man interested in advertising and well acquainted with health and medical problems. He said he thought the doctors were right about 90 per cent

of the time. He said he had acquired more faith in the intelligence of physicians after having had some experiences with experts in other lines. He then stated that lawyers must be wrong exactly 50 per cent of the time, because in every trial one side loses and the other wins; and possibly the one who is right in the lower courts turns out to be wrong in the appeal courts; and more than that, if you give even a supreme court years enough it will reverse its earlier diagnosis.

My personal experience with doctors has been one which prejudices me in their favor. We have spent considerable money with a child specialist, but it has been in the nature of insurance. Our 2 girls, one in kindergarten and one 3½, have never had anything more serious than colds. They were vaccinated and immunized in infancy.

I am convinced that my one good eye, which, although age has rendered it unwise for me to scan the sidewalks while driving through a busy city street, still serves me well in avoiding berserk trucks, in reading in bed, and in absorbing the joy of a sunset, can be credited to my frequent consultation of a good oculist.

But whatever may be our personal experiences, the newspapers are full of remarkable successes in surgery; the vital statistics tell the story of diminished death rates which must be credited, if not to scientific medicine, at least to social reforms and to preventive public health measures made possible

* Read before the Public Health Education Section of the American Public Health Association at the Sixty-second Annual Meeting in Indianapolis, Ind., October 10, 1933.

by the facts furnished through the research of scientific medicine.

That motherhood is in the majority of cases safe and normal, that children can be expected to reach maturity, that tuberculosis can be arrested, are facts that can be counted on with greater certainty than that XYZ tires will not blow out and that runless stockings will remain stationary.

Of course it is true that not every doctor is a scientist. Some are just practitioners—some are just psychologists. And it may also be true that the man who lives in a city and deals with specialists is more impressed with the correctness of medical diagnosis—and perhaps more impressed with the much discussed problem of the cost of medical care.

It is equally true that not every business man is a business man—and recent events have suggested that perhaps you can't always bank on bankers.

So in this world of chance and approximations and trial and error, scientific medicine in the field of health is the only thing in which the public can place a fair degree of confidence.

Shall medicine be publicized?

The ancient tradition of medical ethics, that the private physician should not advertise, is based on sound business principles. Personal fitness is not the sort of thing that can be advertised. Doctor advertising might degenerate into ads like this:

B. C. Hippocrates, M.D.
Member Elite Country Club
Drives a Rolls-Royce
All the latest equipment in his office
Has a perfect bedside manner
Is absolutely sterile

In the building where I have my office there was once a chiropractor who hung out a sign which read:

Dr. A. B. Blank, D. C.
Specialist in everything
Whatever ails you
I can treat it

One night the specialist folded up his tent and departed, to—as far as I know—the never-never land.

Business firms can advertise because they handle merchandise, not personal service only. Businesses can advertise because they have only a few competitors; but a city which contains 1 department store lists 200 physicians.

The medical profession as a unit can engage in what is known to the cult of publicists as institutional advertising. It can advertise the field of medical service as a whole, that is, if certain conditions be fulfilled.

If medicine is a hocus-pocus, a matter of magic or mystery, it were best not subjected to the white light of publicity. But modern scientific medicine is not that. If the majority of doctors do not know how to give a complete medical examination, it might be best not to engage in the periodic examination propaganda. If the medical profession cannot render the service which it offers, it had best not advertise. But the profession rightly claims that its service is as accurate and efficient as the average well advertised commercial product or service. What reason therefore is there for not telling the public of the value of scientific medicine? No valid one that I can think of.

The advantages of making the public conscious of its need for medical advice and care are many. The doctor must live—and if the public is doctor-conscious he can live better. The patient-public wants to live as long and as fully as possible—and if he uses his doctor freely and constantly both in prevention and cure he is likely to do both.

Is it not the duty of the medical profession, then, to help increase the public understanding of the value of scientific medicine?

Shall the public have the facts?

While we still just love to take our

religion and our politics on faith, we are rebelling about swallowing our medicine and our automobiles that way. No longer is the patient content with being told that he has something with a long Latin name. The art of reading learned in our communistic schools, the newspaper and the radio, have made us want to be partners in the discoveries of science as well as in the problems of government and finance. It would be wasted effort to try to sell the idea that scientific medicine is valuable without explaining what scientific medicine is. As a matter of fact we cannot popularize scientific medicine without paying said public the compliment of revealing some of medicine's mysteries.

How shall we do it?

In the typical city there are 4 agencies that are ready-made instruments of propaganda:

The county medical society or academy of medicine

The official public health service

The voluntary health organization

The insurance companies, the dairy companies, and other business interests which profit by the reduction of health hazards.

I have called these instruments rather than media. The publicity media of course are familiar to all of us—the newspaper, the house organ, direct mail, the radio, group speaking, the motion picture, graphic art, demonstrations, and person-to-person publicity. The means of using these media are so well known to public health people that it would seem best to take judicial notice of that fact and confine our discussion to the general outlines of the plan.

There is some difference of opinion among physicians as to how far a county medical society can go in promoting public health, and the unavoidable corollary of such effort—the enhanced fortunes of the profession. The New York Academy of Medicine is an example of what might be called the

liberal tendency. But, whatever may be the inhibitions of the board of governors of a medical society, it certainly can do much through other agencies. In so doing it can furnish the initial motivation through suggestion and organization and can very properly contribute financial support.

The private organization should have a fair proportion of doctors on its board of directors. The National Tuberculosis Association executive committee is made up almost entirely of physicians, and the boards of state and local associations contain enough to give them proper scientific medical guidance. The spokesmen of the medical profession in the country have asserted that it is the duty of the medical profession to assume the leadership in public health movements through active participation in the affairs of voluntary agencies and of the official public health service.

There is in the average community a ready-made instrument of health publicity. It is the tuberculosis association, or in the big cities, the public health federation of which the tuberculosis society is a unit. The chief function of the tuberculosis association is prevention through education. Education is a broad term, extending all the way from ordinary news publicity to child health training methods and the professional postgraduate clinic. It embraces the use of all the media mentioned above.

The tuberculosis movement affords a very comprehensive example of a program of increasing popular understanding of the value of scientific medicine. It has all the earmarks of the modern orthodox PLAN. It has a three-initial label—EDC, early diagnosis campaign, recently changed to SEC, spring educational campaign. It has its trademark—the red double-barred cross, international emblem of the anti-tuberculosis crusade. It is generously

supplied with slogans, such as "Let your doctor decide"; "Every case comes from another"; "Tuberculosis doesn't just happen"; "Protect your child"; "Tuberculosis—the foe of youth"; and an unaccepted one "The early diagnosis catches the germ." It utilizes all the known media. During April thousands of short popular pamphlets are distributed, groups are addressed by speakers, broadcasts are made, small posters and 24-sheet panels are displayed, news is manufactured, magazine articles are placed, and extra clinical service is given.

Now the EDC plan could be spread—without a great deal of thinning—throughout the entire year and could be made to include not only tuberculosis but the entire range of human ills which are susceptible of diminution through preventive efforts. As a matter of fact the National Tuberculosis Association recommends such extension.

The official agency probably does not think its chief function is publicity and education, but on analysis it appears to be. The health department which promotes a community-wide diphtheria immunization project is saving itself the later job of individual case work. One of the best things done by the Iowa State Department of Health is the few minutes a week spent by a doctor with ink in his blood who writes a news release known as a weekly health message. It goes direct to all the 660 papers in the state and often receives as high as a 90 per cent acceptance. The local health department takes advantage of hot news events to add its localized public advice and comment.

The state medical society maintains a speakers' bureau, furnishing, usually at its own expense, physicians who are supposed to be able to talk in popular terms to such interested lay gatherings as women's clubs and noonday men's groups.

The county public hospital and sana-

torium would furnish an excellent laboratory for propaganda if there were in the community a health minded publicity expert given opportunity to use it.

As an example of the part played by business concerns organized for profit, a county coöperative dairy association conducts a weekly broadcast on the health value of milk, methods of insuring purity, milk-borne diseases, and the diet of children. Everyone has seen the advertising in magazines donated by a great insurance company to the cause of public health. As a matter of fact every good insurance man is a salesman of public health. The interests of insurance and of public health are identical—each wants to keep policy holders alive and healthy.

A local plan with limited funds

Now as to the machinery of the set-up, first with limited funds. Stimulated, approved, and assisted by the county medical group the local tuberculosis association can lay out a year round program of popular education. Speakers can be furnished by the medical society and can be lined up easily in other ways. Men like to speak—so do women, it is currently reported. Literature can be distributed. Demonstrations can be arranged. The radio welcomes such a popular subject as health. But in the program it must not be forgotten that after all advertising loses its effectiveness unless the goods it sells are delivered and unless the goods are good. The service rendered by clinics, by visiting nurse associations, by the medical care of the sick poor in their homes, by the public hospital, by the local department of health, must be the best that can be given. The most effective publicity is now, as it always has been from the days of Adam and Eve and the snake salesman, the word-of-mouth person-to-person touch.

Financial campaigns even have their value as educational forces. News-

papers are generous with their space during a community chest drive. The most appealing talking points are visiting nursing and child health. Health work is free from the necessity of much explaining which frequently surrounds the character-building or group social work agency, and at the same time it is not a ready target of criticism as is the relief or family welfare agency. The annual Christmas Seal campaign is primarily an educational device. Its news and graphic publicity is largely a process of adult health education, and its mail sale letters are a still more direct piece of health consciousness selling. It is of real advantage to a community chest to encourage a separate general seal sale, whether or not it underwrites part of the tuberculosis society's budget; because the seal sale is a social service; because the seal sale appeals to the Christmas season generosity urge; because the seal sale is a voluntary process; because the seal sale is democratic in that it obtains small sums from a general cross-section of givers, many of them people not reached by the community chest drive; and because it adds much to the funds available for the local social work program in which the chest is interested without detracting at all from the amounts pledged to the chest.

In all this thought about the tuberculosis society being made the center from which the publicity and educational forces designed to popularize scientific medicine emanate, I am assuming that the tuberculosis organization has either a secretary or an assistant who has training or ability in social work publicity. That is necessary to the proper functioning of any tuberculosis organization.

Such a publicity secretary should function with 2 advisory boards or committees—a social work publicity council, and a health council. He should draw upon the advertising club and the news-

paper fraternity for advice and aid; he should be directed in matters scientific by the medical profession and the public health service; he should coöperate with the many voluntary non-operative organizations which are interested in public health. Speaking of this last, the women's clubs, the men's service clubs, the parent-teacher association, the American Legion, the farm bureau, and several other large and influential groups have some sort of a health program of their own which can be jigsawed into a fine picture of health propaganda.

Such is a possible plan where funds are limited. It is the plan applicable to the average community.

It is pleasant, of course, though not profitable, to speculate upon what could be done with ample funds. The county medical society could employ a social work publicity expert, with adequate staff, or retain the services of a publicity agency. The voluntary health agencies and the public health department and the schools could be subsidized. A program could be prepared that would rival the popularity and effectiveness of dated potables, and fags that do not fag the throat, and remedies that rim that oncoming cold. Such a propaganda would possess the additional advantage that it could always deliver the goods—because there is no longer any possibility of disputing the figures that prove the value of clean water, pure milk, and childhood immunizations.

CONCLUSION

It is a great cause—that of prevention through the increase of public understanding of the value of scientific medicine.

Once a president of the Iowa State Medical Society, Dr. W. A. Rolfe, waxed eloquent in a presidential address that was different from most:

Great is the science that contemplates impenetrable space and studies the whirling

worlds, each in its own sphere, as they have leaped into space from the finger tips of God's creative genius; but greater is that science that snatches from space the mysterious element and applies it that the blind may be made to see and the lame to leap with joy.

Great is that science that delves into the bowels of the earth and seeks to find there the footprints of the Creator, left ages and ages ago in the form of leaf, or flower, or fish, upon the surface of solid rock, or that delves into the earth and seeks to find things of material and industrial value to humanity; but greater is that science that delves into the dark realms of the earth's bosom and seeks for those elements that may be used to alleviate human suffering. Great is that science that seeks to classify the green verdure of the earth, from the modest violet to the sturdy oak, the swaying elm, the weeping willow and the clinging vine; but greater is the science that seeks to find in root, in branch, in leaf, in flower, in fruit, the elements that may be used to smooth the wrinkles from the human pillow of pain, to lull to sweet and peaceful sleep the weary, tired, bewildered brain. Grand is that science, profession, or calling that anchors upon the dark, dim, distant horizon of the future beyond the grave, that bright and brilliant star of hope for life eternal; but grander is that profession

that robs the grave of its victim, and restores the infant, laughing in childish health and glee, back to a grateful, happy, loving mother's arms.

This—and the occasion—and the iced tea—inspired me to indite the following paraphrase of Dr. Rolfe's eulogium:

Great is the doctor that with the magic of drugs lessens pain; but greater still the physician of the future who prevents human suffering. Great the healer that makes the blind to see; but greater the far-seeing physician that with a simple drop or two of liquid in the eyes of the new-born child makes sure that he shall never lose the green of trees and grass and the blue of summer skies. Great is the physician that guides the mother through the valley of the shadow; but greater yet the guardian of motherhood whose wise care lifts the shadow of fear and pain from that valley. Great is the doctor of yesterday who cured; but greater the doctor of tomorrow who cares so constantly that cure shall not be needed.

Great is the doctor of today who has added years to the life we live; but greater the doctor of tomorrow who adds life to the years we live.

Italy—National Bureau of Maternal and Child Welfare

THE Central Council of the National Bureau of Maternal and Child Welfare of Italy recently approved its budget for 1934, providing a government appropriation of 100 million lire. In addition the bureau expects to derive 12 million lire from other sources, among them membership dues.

The bureau is permitted by law to have dues-paying members; the bureau may also receive gifts from private sources; in 1933 these gifts amounted to one and a half million lire.

Fifty-six per cent of the bureau's appropriation for 1934 is to be used for work with married mothers and

children born in wedlock, and 35 per cent for unmarried mothers and children born out of wedlock. As in previous years, the bureau is to give special attention to the prevention of morbidity and mortality of mothers and children and the encouragement of marriages and births.

In accordance with the experiment on financial decentralization begun in 1933, the money will be divided among the provincial branches of the bureau in proportion to the population and economic conditions of each province.—*Rassegna della Previdenza Sociale*, Rome, Dec., 1933.

Rabies Vaccine Protection Tests^{*}

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THE many attempts to establish the potency and efficacy of rabies vaccine by animal protection tests have generally failed to yield consistent results, because of difficulties experienced with the infective dose. The dose is usually either too severe or innocuous, depending on the amount and mode of injection. Intracranial and intraocular injections of a proper dose invariably prove fatal. Other modes of infection—subcutaneous, intravenous, intramuscular, natural or artificial exposure—are so uncertain that similar results cannot be repeatedly obtained with any degree of consistency.

The intracranial injection is most direct, and the intraocular only a trifle less so, from the viewpoint of the distance the virus has to travel from the injection point to the brain tissue. A little further removed, however, is the oral region, and for this reason we selected the tongue as the repository for the infective dose, in the intralingual method of injection.

The method consists in the proper restraint of the animal, under anesthesia or narcosis. The rabbit may be placed in a suitably sized box with a hole at one end allowing for the protrusion of the head. By the use of a mouth speculum or rings with chains, the jaws can be held apart and the tongue grasped with a pair of forceps. We prefer to inject 0.1 c.c. of a 5 per cent emulsion of brain tissue virus moder-

ately deep into the tongue, to one side of the median line, so that a bleb is noticeable. The animal apparently is not inconvenienced immediately or later by the injection and the period of incubation is only slightly longer than that following intracranial injection. Of two sets of rabbits the one injected intracranially averaged a period of incubation of 6 to 7 days, while the other with the same dose intralingually averaged 8 to 9 days. Of the total number injected intralingually 20 per cent survived, while of an equal number injected intracranially 100 per cent promptly developed rabies. Occasionally will an older rabbit survive the intracranial infective dose.

The rabies vaccine protection test is conducted by the subcutaneous injection of 3, 5, or more rabbits with the vaccine, followed 21 days later by the infective dose of virus intralingually. The test rabbits and an equal number of virus injected control rabbits are held under observation for 14 days.

The preparation of the infective dose of fixed rabies virus is an important detail. The rabbit brain tissue "seed" virus, usually kept in 50 per cent glycerine, is emulsified and injected intracranially into a rabbit and when it is moribund, so timed that this will occur on the day the infective dose falls due, it is chloroformed, the brain removed, immediately ground and made up in a 5 per cent emulsion in normal salt solution. The emulsion is strained through a 60 mesh silk and promptly used in 0.1 c.c. amounts.

^{*} Read before the Laboratory Section of the American Public Health Association at the Sixty-second Annual Meeting in Indianapolis, Ind., October 11, 1933.

TABLE I
RABIES VACCINE PROTECTION TEST ON RABBITS

Group	Rabbits	Rabies Vaccine	Interval	Infective Dose†	Results
1	8	(a) 2.4 c.c. 14 days*	14 days	0.1 c.c. Intra- lingually	Living 100%
2	8	(b) 4 c.c. 14 days†	14 days		Living 100%
3	5	Controls			Living 20% Dead** 80%

* 33½% Brain tissue emulsion rabies vaccine (chloroform killed) daily injection.

† 20% Brain tissue emulsion rabies vaccine (phenol killed) daily injection.

‡ 5% Brain tissue emulsion rabies virus.

** Deaths preceded by definite symptoms of rabies.

The rabies vaccine protection test applied to two vaccines, one (a) chloroform killed and the other (b) phenol killed yielded comparable results.

The (a) chloroform killed vaccine tested included 17 brains and cords of rabbits moribund with rabies, which were ground, and 2 c.c. of buffered salt solution added to each gm. of tissue to make a 33½ per cent emulsion to which 1 per cent chloroform was added. The emulsion was kept at room temperature and shaken daily for 30 days. Two rabbits survived intracranial injections of 0.1 c.c. doses.

The (b) phenol killed vaccine tested included 20 brains and cords of rabbits moribund with rabies, which were ground and 4 c.c. of buffered salt solution added to each gm. of tissue to make a 20 per cent emulsion to which 1 per cent phenol was added. The emulsion was kept in an incubator for 72 hours at 37.5° C. Two rabbits survived intracranial injections of 0.1 c.c. doses.

Both vaccines (a) and (b) prepared on 11-27-31 were kept in cold storage and potency tested on 11-28-32, 1 year later, as shown in Table I.

Table I shows that all of the 16 rabbits injected with vaccines (a) and

(b) survived the infective dose, which killed 4 of the 5 controls.

Rabies vaccine protection tests were conducted on mixtures made from samples of rabies vaccine phenol killed, 5 per cent brain tissue emulsion, that are taken and set aside at room temperature, as a routine procedure from each batch prepared.

The rabies vaccine mixtures for 1929, 1930, and 1931 were made from mixed samples of rabies vaccine prepared during the first 6 months of each year. For 1932, two mixtures of rabies vaccine were made, one from samples of batches prepared during the first 6 months, and the other from those prepared during the second 6 months. The mixture for 1933 was made from samples taken from rabies vaccine prepared during the first 3 months.

The normal rabbit brain tissue emulsion was a freshly prepared 5 per cent emulsion.

The vaccine and normal brain tissue emulsion were tested on rabbits as shown in Table II.

The test shows that rabies vaccines (1929 and 1930) exposed to room temperature longer than 2 years, failed to protect rabbits. Rabies vaccines (1931, 1932, and 1933) protected the

rabbits. Normal rabbit brain emulsion did not protect rabbits and 83 per cent of the control rabbits died of the infective dose.

The rabies vaccine protection test was used to determine the number of daily doses of rabies vaccine phenol killed, 25 per cent brain tissue emulsion required to protect rabbits against an infective dose, and also to determine the duration of such protection.

Table III shows the results of three tests. The first, 7-19-32, is the original; the second, 1-5-33, was made on the rabbits surviving the first test, and the third, 7-21-33, on rabbits surviving the first and second tests. The rabies vaccine phenol killed tested was prepared 6-26-32. It was shown to be noninfective as 3 rabbits survived 0.1 c.c. doses

injected intracranially. The rabbits injected with 4 daily injections, all died of the infective dose given 17 days later.

The rabbits injected with 7 daily injections survived the first infective dose but not the second 5½ months later, indicating that protection did not last 5½ months.

The rabbits injected with 14 daily injections survived the first and second infective dose. At the end of a year, they were again injected with the third infective dose, and 2 out of 3 survived, showing protection over a period of 1 year.

The results indicate that the previous injections of 0.1 c.c. of live rabies virus

TABLE II
RABIES VACCINE PROTECTION TEST ON RABBITS

Group	Rabbits	Rabies Vaccine Phenol Killed*	Rabbits injected daily: 2 c.c. doses for 7 days.	Interval	Infective Dose†	Results
1	5	Year 1929		21 days	0.1 c.c. Intralingually	Dead‡ (100%)
2	5	1930				Dead‡ (100%)
3	4	1931				Living (75%) Dead‡ (25%)
4	3	1st 6 months 1932				Living (100%)
5	4	2nd 6 months 1932				Living (100%)
6	5	1933				Living (60%) Dead‡ (40%)
7	4	Normal Rabbits (Brain Tissue 5%)				Living (25%) Dead‡ (75%)
8	35	Controls				Living (17%) Dead‡ (83%)

* 5% Brain tissue emulsion.

† 5% Brain tissue emulsion rabies virus.

‡ Deaths preceded by definite symptoms of rabies.

TABLE III
RABIES VACCINE PROTECTION TESTS ON RABBITS

Group	Rabbits	Rabies Vaccine Phenol Killed*	Interval	Infective Dose† 7-19-32	Results	Infective Dose† 1-5-33	Results	Infective Dose† 7-21-33	Results
1	3	0.5 c.c. 4 days	17 days	0.1 c.c. Intralingually	Dead †100%	0.1 c.c. Intralingually		0.1 c.c. Intralingually	
2	3	0.5 c.c. 7 days	14 days		Living 66% Died 33% (Broken Back)		Dead† 100%		
3	3	0.5 c.c. 14 days	7 days		Living 100%		Living 100%		Living 66% Dead† 33%
4	8	Controls			Living 13% Dead† 87%		(6 Rabbits) Living 33% Dead† 66%		(3 Rabbits) Dead† 100%

* 25% Brain tissue emulsion rabies vaccine daily injections.

† 5% Brain tissue emulsion rabies virus.

‡ Death preceded by definite symptoms of rabies.

intralingually had no appreciable immunizing value, inasmuch as the 7 dose rabbits died, while the 14 dose rabbits survived the second infective dose.

SUMMARY

The intralingual injection of the infective dose of rabies virus makes it possible to obtain fairly consistent results in the protection test of rabies vaccine on rabbits. The test brings out the greater protective value of a series of injections indicating that 7 doses is the minimum to insure survival of the rabbits infected 14 days later.

CONCLUSIONS

1. Rabies vaccine (chloroform killed)

and rabies vaccine (phenol killed) both passed the protection test in an equally satisfactory manner.

2. Rabies vaccine (phenol killed) kept at room temperature fails to protect when the vaccine is more than 2 years old.

3. Rabies vaccine (phenol killed) kept at room temperature for 2 years satisfactorily passed the protection test, supporting the contention that rabies vaccine can be dated for 2 years from the date of issue.

4. The injection of 14 0.5 c.c. doses of 25 per cent brain tissue rabies vaccine (phenol killed) has been shown to result in protection in rabbits lasting at least 1 year.

Early Diagnosis of Primary Syphilis*

Practical Darkfield Examination by Mail

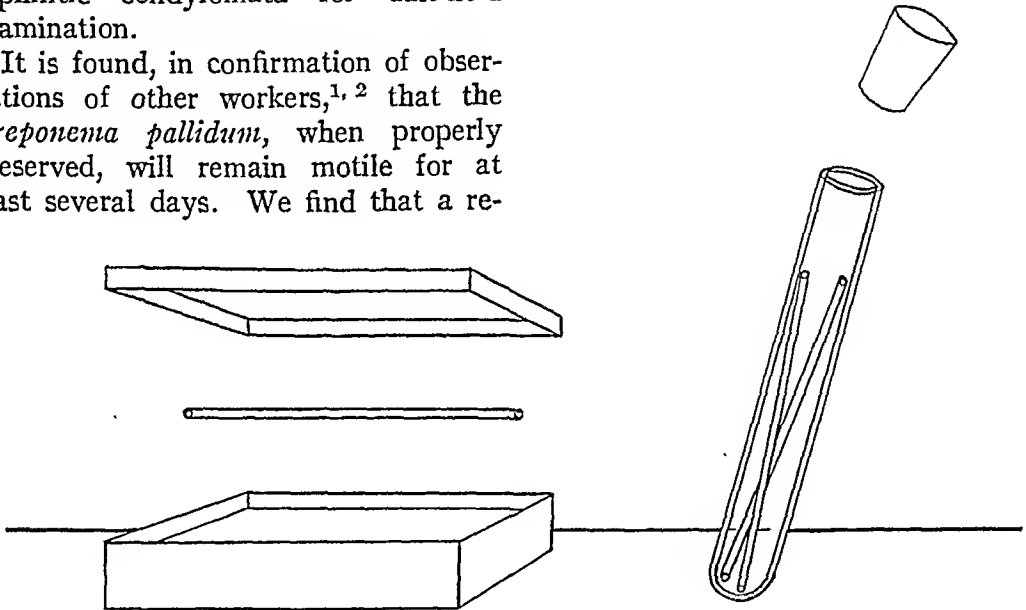
HEWARD ELLIS ELMER

Heiligenwalde über Königsberg (Pr)5, Germany

THE collecting outfit described below has been used successfully by the writer over a period of 6 months in sending by mail, from the venereal disease clinic to the laboratory, specimens of exudate from chancres and syphilitic condylomata for darkfield examination.

It is found, in confirmation of observations of other workers,^{1, 2} that the *Treponema pallidum*, when properly preserved, will remain motile for at least several days. We find that a re-

inclusion of air with the specimen we either fill the capillary tube completely or else break off the ends of the tube close to the enclosed drop of fluid. We then immerse the tubes entirely in vaseline, contained in a small tin box;



liable diagnosis of syphilis by means of the darkfield microscope may be obtained when the laboratory is as much as a week distant by post from the clinic.

We found the prime essential in preserving the viability of the *Treponema pallidum* to be exclusion of oxygen. We collect our material, simplifying the method of Mahoney and Bryant,¹ in small glass capillary tubes. To avoid

by laying the tube horizontally on the vaseline and gently pressing under the surface. At the laboratory the fluid is expressed on to the microscope slide by pressing one end of the tube into a small block of soft paraffin wax (equal parts of wax and vaseline).

The collecting outfit consists of the following component parts:

1. Half a dozen small glass capillary tubes, $2\frac{1}{2}$ " (6 cm.) in length. The tubes used for dispensing smallpox vaccine are of the desired length and bore; or they may be easily drawn

* Paper founded on original work by the author while in the Venereal Disease Clinic, Chicago, Ill.

from glass tubing. These tubes fill readily when touched repeatedly to the drop of lymph exuding from the sore.

2. A small corked test tube to carry the capillary tubes and serve for return of blood specimen for serologic tests. A round-bottom vial, 7/16" x 3", with fairly heavy wall, stoppered with a No. 3 cork, meets requirements.

3. An oblong tin box with removable cover in the long dimension, 3/4 filled with vaseline. A box described as follows was obtained in a stock size: "plain tin oblong seamless slip-cover box, 2-9/16" x 7/8" base by 1/2" deep." A mixture of vaseline containing 5 per cent paraffin wax is of the proper fluid consistency and of a melting point to withstand summer temperatures in the mail without flowing. One lb. of vaseline is sufficient for about 100 boxes.

4. Two grease-free microscope slides (enclosed in a small envelope). These slides are for air-dried smears from the lesion for staining by Fontana's or other suitable method, to provide a permanent record in the laboratory if desired.

5. Data card, 3" x 5", bearing on the reverse side directions for using the outfit.

6. Mailing tube consisting of inner tin cylinder (diameter 1 1/2", length 3 1/2") and outer cardboard mailing case (diameter 2", length 4").

The method here described for pre-

serving the *Treponema pallidum* in a viable state during transmission by post permits a reliable diagnosis of syphilis when the laboratory is situated at a distance from the clinic. For the practising physician, particularly for the physician in the smaller town, and above all from the point of view of the public health department, this possibility is of the utmost importance in that, as has been shown³ treatment of seronegative primary syphilis is almost 100 per cent successful when instituted within 14 days of the first appearance of the chancre and, as has also been pointed out⁴ any diagnosis of syphilis not confirmed by laboratory findings remains practically always open to question.

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Fevers of the Typhoid Group in Members of the Civilian Conservation Corps During 1933

GEORGE F. LULL, M.D., DR.P.H.

*Lieut. Colonel, Medical Corps, U. S. Army, Statistical Sub-division,
Surgeon General's Office, Washington, D. C.*

ON March 31, 1933, the President approved the action of Congress (48 Stat. 22) for the relief of unemployment. As a result, the Civilian Conservation Corps was created and over 200,000 young men were enrolled and sent to small camps throughout the United States.

These men were examined physically and inducted into the Corps by the Army. Army officers supervised their clothing, feeding, and vaccinations, and accompanied them to camps, remaining with them, being in charge of everything except their actual work which was performed under the direction of experienced foresters and woodsmen.

All enrollees were given the regular Army typhoid prophylactic. This consists of three doses of a vaccine containing 750 million typhoid and 250 million paratyphoid "A" organisms per c.c. prepared according to standard technic at the Army Medical School, the first dose being $\frac{1}{2}$ c.c. and the second and third doses 1 c.c. each, administered at intervals of 7 days between doses.

These men were scattered throughout the country in over 1,000 camps, almost entirely in rural areas. In many of these areas typhoid fever was endemic so that the exposure rate was relatively high.

During September and October many

men left the camps upon completion of their 6 months' enrollment period, and new men were enrolled to replace them. The average strength for the 39 weeks of 1933 was 222,967, although it is estimated that approximately 450,000 different men were in the camps at various times during the year.

For the entire group during 1933 there were reported 54 cases of typhoid, 11 cases of paratyphoid "B," and 2 cases of paratyphoid "A." The para "A" infections occurred, one in a soldier of the regular Army on duty at a camp in Tennessee, and the other in an enrollee in Georgia who became ill after only a few days in camp and before vaccination was completed. Both recovered.

This incidence gives a rate of 0.32 per 1,000 per annum for typhoid, 0.01 per 1,000 per annum for paratyphoid "A," and 0.07 per 1,000 per annum for paratyphoid "B." Four of the cases of typhoid ended fatally, a mortality rate of 0.02 per 1,000 per annum.

The 11 cases of para "B" infections were all in the same company in a camp in Kentucky and were traced to a food handler in a local restaurant who was a carrier; all cases recovered.

A study of the 54 cases of typhoid shows that geographically they were distributed as shown in Table I.

TABLE I

GEOGRAPHICAL DISTRIBUTION OF TYPHOID CASES

Texas	32
Oklahoma	10
New Mexico	6
Louisiana	2
Maine	1
Maryland	1
Illinois	1
California	1

54

Data relative to the lapse of time between vaccination and onset of symptoms show that:

Two men reported at camp with symptoms. One man became ill before vaccination was completed.

Three men developed symptoms less than 15 days after third dose of vaccine.

Seven men developed symptoms between 15 and 30 days following third dose of vaccine.

Forty-one men developed symptoms 30 days or more following vaccination.

Considering the 4 fatal cases—one was taken ill 11 days, one 18 days, one 40 days, and one 67 days following completion of vaccination.

Laboratory findings were positive in relatively few of these cases. In some instances laboratory facilities were not available in the hospitals where the patients were treated. Diagnosis was based, therefore, upon clinical findings only in quite a number of cases. As an example in the para "B" outbreak in Kentucky, organisms were isolated from 3 cases only. However, the 8 other patients ill at the same time had the same train of symptoms, so were considered clinical cases. The examination of the food handler in the restaurant was positive for para "B" type organisms.

Polluted water supplies were regarded as sources of infection in 44 of the 54

cases. Although chlorinated water was supplied in camp and men were instructed to carry canteens when absent at work, there was evidence in these cases that the rules were disobeyed and well and stream water from unauthorized sources was ingested.

The largest outbreak occurred in a company encamped at Hamilton, Tex. This company had 29 cases with 1 death. The members of the company worked in the country some distance from the camp, and the source of infection was thought to have been a well which supplied water to a family in which there had been 2 cases of typhoid during the last year. Examination of the water showed a high bacterial count with many *B. coli*. Two members of the family residing here were also found to be carriers.

In the regular Army during 1933 there were 4 cases of typhoid reported from troops within the United States, a rate of 0.04 per 1,000. The rate of the total Army at home and abroad was also 0.04 per 1,000.

If the number of members of the CCC exposed to typhoid (approximately 450,000) rather than the average strength be considered, the rates would be 0.12 per 1,000 for typhoid, 0.004 per 1,000 for para "A," and 0.024 for para "B" with a mortality rate of 0.008 per 1,000.

CONCLUSIONS

Infections with the typhoid group were very low in the CCC during 1933. This is especially true if the number of individuals exposed is considered.

The case fatality rate for typhoid was 7.4 per cent. There were no fatal cases of paratyphoid.

A Semi-Automatic Delivery Pipette

MAJOR F. E. DANIELS, F.A.P.H.A.

Pennsylvania Department of Health, Harrisburg, Pa.

THE pipette described on page 59 of the January 1934 number of the *American Journal of Public Health* is interesting and quite useful. It is rugged but limited to the particular volume for which it is made.

On several occasions the writer has constructed a similar pipette to be used for delivering different quantities by the use of interchangeable measuring reservoirs. These pipettes are somewhat simpler and can be easily constructed in the laboratory by anyone possessing only such skill as a good laboratory technician should have. The only piece necessary to purchase would

be the 4-way stopcock, as all the rest is easy. As commercial 4-way stopcocks have different styles of bored plugs, it is important to see that the plug be quadrant bored as shown.

The two side arms are bent upward and cut off at a convenient length.

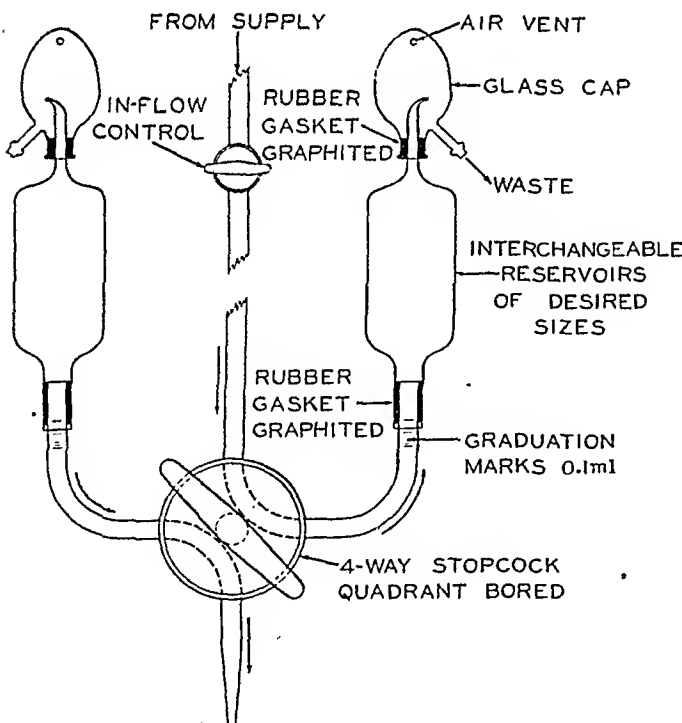
The top arm is connected with the reservoir of water or material to be dispensed.

The bottom or delivery arm is cut off and drawn into a nice tip.

The side measuring reservoirs may be made to hold any desired quantities. The writer has used interchangeable vessels for 9 ml. and 99 ml. water blanks. The shanks slip over the upturned side arms and are adjusted to calibration marks of 0.1 ml. for the proper correction for loss in the sterilizer. A rubber gasket well lubricated with graphite makes a firm connection but allows easy adjustment and removal for change of size.

It is well to mount the pipette on a firm wooden support although local conditions suggest various ways of arrangement. The in-flow may be controlled by a stopcock so that one reservoir fills just as the other empties.

NOTE: The 4-way quadrant bored stopcock can be obtained by special order through the Corning Glass Works, Kimble Glass Company, Eimer and Amend, or Arthur H. Thomas Company.



SEMI-AUTOMATIC PIPETTE

Scarlet Fever Toxin—A Successful Immunizing Agent*

O. B. NESBIT, M.D., AND SUE THOMPSON, M.D.

Board of Education, Gary, Ind.

SUMMARY

AFTER giving 49,165 doses of scarlet fever toxin, 20,278 primary Dick tests, and 12,713 Dick retests in the Gary schools, we have found that scarlet fever immunization as recommended for use by the Scarlet Fever Committee is a safe procedure and that it is a valuable asset to a community as a prophylactic measure.

During the 8 years preceding 1925 when Gary's school census varied from 9,811 to 18,438, there were 26 deaths from scarlet fever among 1,241 cases reported. In the following 8 years, up to the present time, since immunization has been carried on, the school census has varied from 20,472 to 28,032, and there have been 1,147 cases with 13 deaths.

In giving Dick tests it is important that exactly 0.1 c.c. of test material is injected intradermally; that the potency of the material is checked; and that the tests are read from 22 to 24 hours later in clear daylight. If there is a question as to whether the test is negative or positive, it should be considered positive and the child should be given doses.

Some severe but no serious reactions have resulted from the 49,165 doses of scarlet fever toxin. When we consider that in one school center last year, out

of 114 who began doses, 107 finished, we see evidence of the infrequency of severe reactions to doses.

During the past year 2,055 primary Dick tests were given, of which 762, or 35 per cent, were negative. Of 368 who were given the usual 5 doses and given a Dick retest 2 weeks later, 788, or 91 per cent, were negative.

During the past year when we retested 171 who had had the usual 5 doses 5 or more years previously, 139, or 81 per cent, remained negative.

Of the 18,980, the total number of primary Dick tests read during 9 years, 46 per cent have been negative.

Among a group estimated at 10,000 who have completed scarlet fever toxin doses, there have been only 9 persons who had a negative retest who have later been reported with scarlet fever.

CONCLUSIONS

1. The most common error in interpreting Dick tests is to read a slightly positive test as negative. The child should be given the benefit of the doubt, and if the reading is questionable he should be given a series of doses.

2. The reaction to the Dick test in an individual may change. May this be due to the general physical condition of the individual concerned? May it be due to a deficient immunity mechanism? This fact, that it is possible to be immune at one time and not immune at another time, may account

* Summary of paper delivered at a Joint Session of the American Association of School Physicians and the Child Hygiene and Public Health Nursing Sections of the American Public Health Association at the Sixty-second Annual Meeting in Indianapolis, Ind., October 9, 1933.

for the occurrence of scarlet fever in those who have had a negative Dick test. Errors, or change in Dick tests, may occur from: (1) impotent test material, (2) improper injection of the amount or depth, (3) errors in interpreting tests, (4) change occurring in the person tested that permits him to be negative and change to a positive.

3. The full dosage usually should be given at each injection. In a small percentage of cases it may be advisable to repeat the previous dose if a severe reaction has occurred.

4. Urticarial reactions may usually be prevented by giving 0.25 to 0.5 c.c. of adrenalin with the scarlet fever toxin dose. We do not recommend the administration of adrenalin except to persons likely to have urticaria or to the few who may have a tendency to very severe emesis and prostration following a dose.

5. A Dick retest should be given 2 weeks following the last dose and a 6th dose (80,000 to 100,000 skin test doses) should be given if the retest is positive. If a person who has been given a full series and a 6th dose is later found to be still positive, a second series is advised. If, however, such person is at a later date found to be positive again, we usually do not recommend a third

series; but more doses may be given if desired.

6. Immunity obtained from 5 doses of scarlet fever toxin is apparently comparable in results and duration with the immunity against diphtheria obtained in Gary with 3 doses of diphtheria toxoid, a total of 3 c.c., having an antigenic value of $4\frac{1}{2}$ to 8 units per c.c.

7. Most susceptible persons may be made immune to scarlet fever as evidenced by the Dick reaction.

8. Dick tests should be made at certain intervals on a person, even though he has had a Dick negative test.

9. The Dick test appears to be a reliable means of determining susceptibility or immunity to scarlet fever. Persons who have been tested recently and pronounced negative usually escape the disease. They may be carriers and they may spread infection. Symptoms which lead one to suspect that a person who has been closely associated with a scarlet fever patient is a carrier are the presence of acute abnormal discharges in the nose; inflammation of the mucous membrane of the nose or throat; or a mouth full of carious teeth. The presence of hemolytic streptococcus from cultures made from the nose and throat would be stronger evidence of the person being a carrier.

Integration of Federal, State and Local Agencies^{*}

THE following memorandum has been prepared by the Committee on Federal Relations of the State and Territorial Health Officers and approved by every member thereon:

It is the well considered opinion of the committee that a specific and definite policy of the Federal Government should be formulated for discharge of the responsibility of that element of government in the development and maintenance of local health work. Such policies have been formulated in many other functions of government and express or imply the relationships of the several elements of government, each to the other.

Policies with reference to public health administration in the past have been, in most instances, outgrowths of emergency situations, and this has been especially true of the aid extended by the Federal Government in the development and maintenance of local health service. Quite obviously, the reason for this situation is a failure on the part of the body politic to recognize basic responsibilities for continuing work, and to demand continuing support for the discharge of these responsibilities.

Crystallization of a policy into statutory law will be of material aid in bringing about a more constructive understanding and appreciation of fundamental needs in the protection and promotion of the public health, an understanding that it is not the dramatic emergency which is responsible for the greatest loss in vital resources but the unspectacular and insidious conditions that are constantly at work.

This can best be accomplished through the enactment of special legislation which, in addition to enunciating permanent policy, would definitely fix the amount appropriated on a continuing basis and thus avoid the necessity for defense of the appropriation each year.

With these thoughts in mind, the committee respectfully recommends that an Act incorporating the following expressions of policy be prepared and presented to Congress for the purpose of enabling the U. S. Public Health Service to cooperate with state departments of health in the development and maintenance of local health work:

1. There should be in the Act a declaration of policy stating the reasons for and objectives of the Act similar to the following:

It is recognized that the conservation of vital resources through the protection of human life and human health is a national economic necessity; that throughout the United States there is unnecessary wastage of vital resources; that preventing the spread of epidemic diseases from one state to another is the responsibility of the Federal Government; that the most effective means of preventing the spread of such diseases lies in eradicating, at the source, of the conditions responsible for continuing existence of communicable illness; and that many communities, especially in the rural areas of the country, do not now possess resources sufficient to permit the support of necessary health service without aid from other sources.

Therefore, it is hereby declared to

^{*} Report of the Committee on Federal Relations of the State and Territorial Health Officers.

be the policy of the Congress to promote the development of national, state and local health service of such extent and character as to equalize the opportunities for life and health of all the people of the United States and to make possible the prevention of the inter-state spread of disease in the most effective manner.

Since, in the experience of the health authorities of many states it has been clearly demonstrated that the establishment of permanent full-time local health units constitutes an economical and effective method of providing adequate local health service, it is also declared to be the policy of the Congress to render aid in promoting as a primary objective the further development of local health service by providing financial assistance from the Federal Government in the maintenance of full-time local health units in the several states.

2. Authority to detail officers of the Commissioned Corps and other technical personnel for coöperation with state health departments in promoting and assisting in the administration of this service should be granted specifically, by the statute, to the Surgeon General of the U. S. Public Health Service.

3. The principle of basing grants to states on the development of local units of organization, the grants to include a fixed amount per local unit of government with an additional equalizing differential granted on a per capita basis per local unit of government, should be followed rather than that of allotting flat and per capita grants by states. The U. S. Public Health Service should be authorized to study the varying needs of local governments in coöperation with the states, together with the varying ability of local governments to finance local health service. Based upon such studies the U. S. Public

Health Service should be authorized to promulgate rules and regulations prescribing the amount of aid found to be necessary in varying classes of local units of health organization.

4. The U. S. Public Health Service should be given authority to prescribe by regulation any other conditions including the qualifications of personnel, necessary for the wise and effective expenditure of allotments.

5. Allotments to the states for local units of health organization should not be in excess of 50 per cent of the total budget in the beginning; and within not more than 5 years the county and state should assume not less than 75 per cent of the total costs. It is believed to be sound policy to provide for the continuance of a maximum of 25 per cent of the total budget so long as the need for assistance can be satisfactorily demonstrated.

6.* There should be authority for a continuing appropriation which would provide the sum of \$2,000,000 for the first year, increase at the rate of \$500,000 per annum each subsequent year to a maximum of \$5,000,000 available for the 7th year, and continuance at this rate indefinitely thereafter.

7. The U. S. Public Health Service should be granted authority to allocate a specific percentage of the total appropriation for the administration of the service as a whole and to provide for technical consultant service personnel.

E. L. BISHOP, M.D., *Chairman*

* With approximately 600 county health departments at present in the United States and with approximately 3,000 counties in the country, it is believed that the sums mentioned will be required to provide the assistance necessary for reasonably adequate staffing of existing local units of health organization and an orderly growth in the development of any new full-time units. It is apparent that the appropriation of \$2,000,000 for the initial year would provide an average of \$2,500 per annum for the 600 counties now organized, and for the organization on the same average allotment of 200 additional counties throughout the United States. It is understood, of course, that any part of the \$2,000,000 which might not be used the first year would be returned to the Treasury.

High Lights of the Biennial Nurses' Convention, Washington, D. C.,

April 22-27, 1934

EVA F. MAC DOUGALL, R.N., F.A.P.H.A.

*Director, Bureau of Public Health Nursing, State Division of
Public Health, Indianapolis, Ind.*

THE attendance of 7,900 nurses broke all Biennial records. There was speculation as to why so many could afford to get away in these times. However it must be remembered that there is a membership of over 100,000 in the American Nurses' Association, and then the National Capital in the spring was a drawing card. But one could sense subtler reasons than these for the big attendance—an eager quest for knowledge on the part of the nurses; a feeling that times are changing and that nursing must change with them; that there must be better distribution of nursing services; better organization in nursing; closer planning of nursing organizations with other agencies, both local and national.

THE KEYNOTE OF THE PROGRAM WAS CHANGE

This was evidenced by the following topics for some of the joint sessions "The Changing Order of Today" as it Affects the Economic World; Community Life; The Field of Education; Hospitals; and Nursing.

One of the most inspiring addresses at the Joint Sessions was made by a consulting engineer, David C. Coyle, of Washington, D. C., who said that the RFC was a sedative, that the only new thing in this depression was the spasm of bankruptcy, that the price of

progress is capital loss, that taxes will have to be laid on personal income, that "saving for a rainy day makes it rain all the harder," that services is what civilization is really made of. He predicted that there will be fewer men employed in industry because of labor saving devices, that there will be more leisure for all, that those not employed in industry, not sick, and not on an old age pension will be employed in services. Speaking of nursing particularly, he said "It is just your good luck that the things you have always wanted to do for improving the health and happiness of the people happen to be the things that must be done in order to make the economic system operate."

Enlarging on the word services he said they would include building dams on the tributaries of the Mississippi; building sewage disposal plants; eliminating parasites on society like criminals and gangsters; guarding the health of children to make them easier to look at. There will be more money spent on cultural services. Not all will be engaged in highbrow art—some will be "stage hands." Jobs will be more variegated in the future, making workers more intelligent.

Speaking of what use will be made of the more abundant leisure time, he said most people for the last half million years have had to work desperately

hard to keep alive, and that human beings when freed from hard work do not become lazy—they generally have an outburst of energy.

An official from the Federal Emergency Relief Administration, Aubrey Williams, speaking on *The Changing Order of Today as it Affects the Community*, stated that 3,000 units in FERA were working in 9,000 communities in this country affecting 3 million families and from 20 to 25 millions of people.

There is a great change in the attitude of government in that for the first time it announces its interest in the welfare of its people. The federal government has led the way in this and insisted on the same attitude from the states. The government is also insisting that standards be maintained among its professional workers, and is breaking through provincialism by insisting that the ones giving the best services get the jobs.

DISTRIBUTION OF NURSES

C. Rufus Rorem stated that in 1929 only 9 per cent of the people received private duty nursing care, and in that year half the people receiving this care had salaries of over \$5,000 a year; yet people of all other economic grades have about the same amount or more of illness.

Dr. C.-E. A. Winslow of Yale stated that of all nurses one-tenth are in public health, three-tenths in institutions, and six-tenths in private duty. He feels that public health nursing should be for all classes of patients, that there is a discrepancy between hourly nursing and 8 hour duty nursing. He wonders why one agency in a community cannot be equipped to supply all nurses needed in the home—sort of a combination between a nurses' directory and a visiting nursing service. He feels that the separation between nursing done in the hospital and that furnished the

patient in the home by private duty or public health nurses is too sharp.

OF PUBLIC HEALTH NURSING SIGNIFICANCE

Perhaps the greatest revelation the convention brought the public health nurses was the recognition on the part of all of the growing responsibility of official public health nursing agencies. This was well illustrated by the fact that the new president and new first vice-president of the N.O.P.H.N. are superintendents of nurses in two of our big city health departments. Also by the fact that the U. S. Public Health Service has just put one of our leading public health nurses on its staff as a Consultant, who will have another public health nurse as her assistant to make field studies.

Another general feeling brought out that waxes stronger from year to year is the importance of securing the active interest and support of laymen not only in public health nursing, but also in general nursing education and nurse training.

Mrs. Franklin D. Roosevelt, addressing a joint session, stated that the trend in nursing is from private duty to public health nursing. Another trend is toward more teaching on the part of the nurse "to show us how to live physically so we may be healthier, happier people."

Dr. Royal S. Copeland, Senator from New York, stated he felt it was poor economy for communities to cut down on public health and social work when they were spending billions of dollars to counteract crime. He would have the public health nurse know more about psychology and mental hygiene so she could help the teachers pick out the potential misfits in society, and help the parents and social agencies and physicians in a community to correct wrong tendencies early, if possible. He would have a public health nurse work-

ing in every schoolroom in the country. This is right in line with what Herbert Hoover said, "One good community nurse will save a dozen future policemen."

The report of the N.O.P.H.N. Survey of Public Health Nursing brought other revelations to all groups of public health nurses. It is out in book form now obtainable for \$2.00 from The Commonwealth Fund, New York, or the Book Service of the A.P.H.A. It behooves every public health nurse to read it for, as Katharine Tucker says, "It is the first time in the history of public health nursing in the United States that a study so comprehensive in scope and analytical in method has been made possible."

The School Nursing Section of the N.O.P.H.N. had a spirited round-table session on the "Significance of this Survey Report for School Nurses." As a result, a fine report with resolutions and recommendations was made by the secretary at the final N.O.P.H.N. session, which we hope will have wide distribution and deep study.

MEETING OF STATE ADVISORY NURSES

The convention was extended over one day, April 28, to take in an all day session of this group in the Auditorium of the U. S. Public Health Service. Between 20 and 30 states sent their state advisory nurse or a representative. Others present were 4 members of the N.O.P.H.N. Staff, a public health nurse (who presided), and a physician from the U. S. Public Health Service; the Superintendent of the U. S. Public Health Service Nurse Corps; the Supervisor of Nurses of the Indian Bureau; the National Director of the American Red Cross Public Health Nursing and Home Hygiene Service; and the Director of Public Health Nursing for the Ontario Department of Health of Toronto.

C. E. Waller, M.D., Assistant Surgeon General U. S. Public Health Service, welcomed the nurses and sketched briefly the history of the development of the service. Other topics taken up on the morning program were Personnel Practices; Suggestions for Supervision and Staff Education; Records and Reports as Supervisory Devices; General Relationships; and Relationship of Nursing Agencies to the Medical Profession.

In the afternoon Alma Haupt of the N.O.P.H.N. discussed "What We Have Learned From the Civil Works and Relief Program." Some of her conclusions:

Rules No. 7 recognized nursing care as a legitimate lien on relief funds. An existing public health nursing agency could be used and paid on a visit basis.

Results of CWS Employment of Nurses:

Success in getting many unemployed nurses back to work.

40 states had state advisory committees.

New methods of giving staff education to rural nurses were devised.

Interest in getting public health nursing training was stimulated in many new nurses.

Well planned projects stimulated new interest in communities in public health nursing.

Marion Sheahan, Director of the Bureau of Public Health Nursing, State of New York, outlined the points on a questionnaire that is to be sent to advisory nurses in state health departments to form the basis of a proposed review of these services—a joint project of the Public Health Nursing Section of the A.P.H.A. and the N.O.P.H.N.

With the growing responsibility of state advisory nurses for the development of public health nursing in their state in keeping with the trend of the times, many at this meeting expressed their need to meet annually under the auspices of the U. S. Public Health Service just as the state health commissioners and sanitary engineers do.

RESULTS OF THE ELECTION

National Organization for Public Health Nursing.

President, Amelia Grant, New York, N. Y.

First Vice-President, Grace Ross, Detroit, Mich.

Second Vice-President, Mrs. C.-E. A. Winslow, New Haven, Conn.

Treasurer, Michael Davis, Chicago, Ill.

Board of Directors—Non-Nurse Members, William Draper, M.D., Richmond, Va.; Estella Ford Warner, M.D., Washington, D. C.; Alfred E. Shipley, M.D., Brooklyn, N. Y.; Mrs. James K. Watkins, Detroit, Mich.

Nurse Members, Mrs. Anne L. Hansen, Buffalo, N. Y.; Katherine Faville, Cleveland, Ohio; Sophie C. Nelson, Boston, Mass.; Agnes Talcott, Los Angeles, Calif.

American Nurses' Association

President, Susan C. Francies, Philadelphia, Pa.

First Vice-President, Julia C. Stimson, Washington, D. C.

Second Vice-President, Mabel Dunlap, Moline, Ill.

Secretary, Helen Teal, Indianapolis, Ind.

Treasurer, Emma M. Nichols, West Roxbury, Mass.

Directors, Elnora Thomson, Portland, Ore.;

Katherine Densford, Minneapolis, Minn.;

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FEDERAL EMERGENCY RELIEF AND PUBLIC HEALTH

FOR some time we have had in mind giving to our readers a clear statement of what the CWA, FERA, CCC and other emergency relief agencies have been doing for public health. All have seen items from time to time from one state or locality or another, but nothing has come out giving collective statistics. After trying various leads, a letter was addressed to the Federal Emergency Relief Administrator. This was replied to by the Director of Public Relations, and the statement was made that, owing to the fact that the CWA endeavor was put into effect almost over night, using machinery of federal, state and local agencies already established, as well as new administrative bodies formed for the purpose, and because the whole movement went forward at such a tremendous pace, it had been impossible so far to collect correct statistics for all the states and from all the bodies which have been engaged in this work. The pressure of relief work as well as the necessity for speed was great. It has seemed worth while to give what we have been able to find out. We are open to both correction and amplification.

Among the projects adopted, we find "Classification G. Sanitation," under which sanitary and storm sewers were constructed, ditching and cleaning of creeks, with the filling in of low places were carried out; sewage disposal, incinerator plants and sanitary privies, septic tanks, etc., were constructed. Under "Classification H. Waterways and Water Supply," come a number of projects which influence public health directly. "Classification F. Pest Control" includes mosquitoes, drainage, oiling and stream clearing.

Under the CWA projects, No. I relates to those benefitting public health. Under this heading come typhus fever control, for which \$1,143,000 was appropriated; spotted fever control, \$79,500; malaria and filariasis control and sanitation, \$312,046; malaria control, \$4,500,000; rural sanitation, \$5,000,000, and the sealing of mines, \$1,519,750. On these projects it was estimated that some

53,000 men were employed. On March 31, the CWA, as such, went out of business and the uncompleted projects under it, including public health, are being continued under the Works Division of the FERA.

The projects including Malaria Control, Rural Sanitation and Sealing of Mines were carried on under the auspices of the Public Health Service, which also took part in Spotted Fever and Typhus Fever Control. The Administrator believes that in a few months (136 days) more has been accomplished for the control of malaria than has been possible in 25 years under the restriction of budget necessary in the Public Health Service. Some 30,000 men were put to work draining and cleaning up breeding places of the mosquitoes.

Some 32,000 men were employed in improving sanitary conditions in rural districts, largely in the South. A large number of sanitary privies have been constructed and the educational value of the demonstration given in proper disposal of excreta has undoubtedly reached a very large number of persons and will do good to many for a number of years, and it is to be hoped, permanently.

The sealing of abandoned mines is being carried out chiefly in Pennsylvania, West Virginia, Kentucky, and Ohio, since discharges from them are changing certain streams from an alkaline reaction to an acid, rendering the treatment of this water for drinking purposes difficult.

We have already run an editorial written by Colonel W. M. Bispham, Medical Corps, U.S.A., on the work of the CCC camps. Although not listed as a measure for promotion of public health, there must be mentioned the expenditure of \$100,000,000 on slum clearance and modern inexpensive housing under the Public Works Emergency Housing Corporation. This must exercise a wide-reaching effect on health.

Apart from the work which has a direct public health value, the fact that approximately one billion dollars, according to the estimate of the Administrator, has been spent, 750 million of which was for labor and the remainder for material, has necessarily had a good effect on public health generally. The maximum payroll has been as high as 60 million dollars a week. In the United States during October and November, some 14,600,000 people were receiving unemployment relief.¹

A limited amount of observation indicates that the people receiving relief spent the money given to them wisely, and the same is true of the CWA workers. Of those receiving relief in January, 1934, 42 per cent were children under 16 years of age, with 36 per cent of preschool age.²

Needless to say, in an enormous project gotten up and put through at such a tremendous speed, there has been some graft and some foolish expenditure, as well as waste. A striking instance of this is the assignment to a man holding the degree of B.S. in Agriculture (incidentally, the most appropriate degree that any university gives) to make a study of poliomyelitis. It is not clear just what conclusions were reached, but we are led to believe that it is probably dangerous to let concrete come in contact with drinking water! Nearly 20 pages of foolscap were wasted on this wonderful paper, entitled, "What is Poliomyelitis? Is not Its Infective Agent a Micro-inorganism?" However, in spite of some drawbacks, there is no question that much good work has been done, and it is greatly to be hoped that permanent results have been achieved.

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WILLIAM HENRY WELCH

THE death of Dr. Welch, who reached his 84th birthday on April 8, 1934, removes from the medical world a notable figure. He had been suffering from cancer of the prostate and had been practically confined to the hospital for more than a year.

Dr. Welch and the late T. Mitchell Prudden shared the honor of being the American pioneers in renouncing medical practice and devoting themselves wholly to teaching and investigation in pathology. "Finally there appeared on the horizon in this country a few anomalous individuals who cherished the notion that the science of disease, even in its etiological and morphological aspects alone, was broad and deep enough to command the exclusive attention of its devotees" (Prudden¹).

Dr. Welch was among the first to take up and teach the new science of bacteriology in this country, after having returned from some four years of study in various schools in Continental Europe—Breslau, Strassburg, Leipzig, Vienna, and Berlin. He held the chair of Pathology at Bellevue Hospital Medical College, New York, from 1879 to 1884, when he moved to Baltimore as Professor of Pathology of the Johns Hopkins Medical School, a position he held until 1916, when he became Director of the School of Public Health in the same institution. From 1893 to 1898 he was Dean of the medical faculty there and was one of the original four in the Medical School, the others being Drs. William Osler, William S. Halsted, and Howard A. Kelly, the last being the only surviving member of the group.

Dr. Welch's interest in bacteriology was always great and it was natural that he should develop great interest in public health, which constantly grew and culminated in the establishment of the School of Public Health, of which he was the first Director, and the funds for which were obtained through his influence.

He was one of the first to see the importance of the antituberculosis movement in this country, was active in the formation of the National Tuberculosis Association, and became its President in 1910.

He has been connected with the Rockefeller Institute, of New York, and the International Health Board since their foundation, and has had great influence in determining donations of Mr. Rockefeller to the advancement of public health, and medical education. Since 1901 he has been President of the Board of Directors of the Rockefeller Institute.

It is to be regretted that Dr. Welch did not embody his experiences in a volume, though numerous addresses have been collected by his friends. He was born just before Pasteur began to publish the story of his discoveries. He saw the birth of the so-called germ theory of disease, its rise, and its proof, and witnessed the isolation of all the pathogenic organisms, both vegetable and animal, now known to us. Truly he lived through the most remarkable period of the world's history, and a chronicle from his facile pen would have been invaluable.

Perhaps no scientific man who has ever lived had as many honors as Dr. Welch. From every part of the world came degrees and titles. He was a facile speaker, always charming and always carrying his audience with him.

His personality was delightful. He was approachable, genial, interesting, a friend of young men, and ready to give credit to every beginner. He has probably done more to stimulate work and encourage scientific men than any other teacher in America. Apart from his teaching, he was interested in all public

health movements, serving on boards and engaging in many other activities for the public good. He was President of the State Board of Health of Maryland from 1896 to 1922. He was a charming host, and delighted in entertaining distinguished men who visited this country, but always included among his guests not only those closely connected with him in his work, but other young scientists who might be available.

His life has been a striking example of devotion to science for science's sake. Commercialized, his salary could have been easily more than a hundred thousand dollars annually; yet for practically all his life, it was only the modest stipend of a professor.

During the World War he was one of the first to go into the service of the country in 1917, as a Major in the Medical Corps, being advanced in 1918 to the grade of Colonel. He spent much of his time in Washington, where his advice to the Medical Department of the Army was invaluable. The soldiers who were engaged in the World War owe much to his wise counsel for the care taken of them.

He has been a member of the Laboratory Section of the Association since 1917, and was made a Charter Fellow in 1923. The Association as a whole mourns his loss and pays tribute to his memory.

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THE MEDICAL EXAMINATION OF FOOD HANDLERS

THE outbreak of amebic dysentery in the City of Chicago in the summer of 1933 has excited unusual interest. Nothing was published about it until October 9, when a paper was read before our Laboratory Section at Indianapolis. Cases have been traced to more than 200 cities, including some in Canada, which had their origin in Chicago. The Public Health Service was called on and two news letters were sent out regarding it. In February, an article on the subject appeared in the *Public Health Reports*.¹ It is known that carriers of the *Endameba histolytica* are found fairly commonly, and one great question which comes up for discussion is the advisability of examining food handlers. On this there is diversity of opinion. Some health officers believe it to be ineffective and that the expense is not warranted by the results. Extravagant statements are made against it by some, one former health commissioner going so far as to call it a "worn out superstition of public health."

In the article referred to there is a good deal about the examination of food handlers, especially in regard to those carrying amebae. The tone is negative, and every possible difficulty and objection is pointed out. The author speaks of the inadequacy of methods, the number of examinations necessary to give a conclusive answer, the intermittency of the carrier condition, the time, effort and expense involved, and the difficulty of controlling carriers when detected. The danger of carriers is recognized. The opinions of the two schools of protozoölogists are spoken of. The difficulty of, and errors in, diagnosis are mentioned, but do not seem to be a good reason for not trying to prevent the ailments from which those infected suffer. Finally, the author states that even a positive report will be misleading, since a cyst carrier may be suffering from a condition not related to the presence of the protozoa. In the face of conditions which exist, we

believe that the positive and not the negative side of the question should be taken.

We cannot but recall the outbreak² on the Steamship "Rochester" in 1913—300 passengers; 235 traced; 122 cases of gastroenteritis, 42 cases typhoid-like; 5 deaths. Cause—a meat cook with profuse diarrhea in febrile stage of typhoid. We remember also Typhoid Mary, who according to the last accounts which we have, has been the cause of 57 cases of typhoid fever, with 3 deaths, and there are some who believe that she was responsible for the infection of water which caused the epidemic in Ithaca, N. Y., in 1903. We also recall the case of "H.O." who though not a food handler, infected the water supply of a ship by using the common water supply. In regard to all of these cases, we would ask whether or not the examination of food handlers would have been worth while?

There is no doubt that the examination for amebae offers greater difficulties than does the examination for bacteria, and there is recent evidence that carriers do not play as important a part as they do in bacterial diseases, but the general principle remains unchanged. A recent survey of 2,000 food handlers in New York City³ shows a total of 35 cases of latent adult tuberculosis, and 46 cases of active pulmonary tuberculosis. Can the employment of people with active pulmonary tuberculosis in such callings be justified? Can they be detected without examination?

As to the carrier condition, we know of no better statement than that made by the late Dr. Henry J. Nichols.⁴ The article under discussion indicates that there is nothing to do with food handlers except to educate them in personal hygiene, which all recognize would be a valuable means of prevention, but the question is raised as to whether they can be made sufficiently conscious of the menace to make this measure effective. Dr. Nichols says that carriers may be instructed in personal hygiene, but that if they do not respond to social obligations, restrictive measures must be applied. In the instance of Chicago, in spite of the recent report of the special committee, it would have paid handsomely to have had an officer stationed in the toilet rooms to enforce observance of the rules laid down by the committee.

On the question of the results justifying the expense and trouble, Nichols points out that "as scientific knowledge increases, there is an increasing demand for its application in the amelioration of human life." In regard to the difficulties on the administrative side, he says: "But one point should be kept clear. The interests of the group of [or] race are supreme over those of the individual. This decision has been handed down by Nature and by Society and other decisions must conform."

We have recently spoken of the movement in New York City, where a committee is urging the public to demand cleanliness in eating places. This movement will be carried out largely through education of the public. While the public may be apathetic in many cases, there is no question that when there is proper education there is a growing demand for the application of scientific facts to public health.

The article also questions the advisability of treating all food handlers with amebicides in the present state of our knowledge, though recognizing the necessity of treatment of recognized clinical cases, even though mild.

From the scientific standpoint there is perhaps nothing in this article which can be found fault with, but published in the official organ of the Service, we believe it is liable to do a great deal of harm. Similar difficulties have confronted

us in the control of all contagious diseases, and if we had sat with our hands in our laps looking only at the difficulties and not for means of overcoming them, we would be in a sorry condition today, whereas the advances we have made constitute one of the great features of which the medical profession has good reason to be proud. We look for leadership in progressive measures for the protection of health, rather than a negative attitude or a recital of difficulties.

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LETTER FROM GREAT BRITAIN

THE DROUGHT, THE WATER SUPPLY,
AND DISEASE

The description of the British climate alleged to have been applied by a visiting American as, in fact, no climate at all but merely a series of samples, is one that the average Briton accepts as at once witty and accurate. Variability is undoubtedly one of the characteristics of the weather, the variations commonly suffered including as a rule a rather generous allowance of rain.

Up till the last 12 months or so, at any rate, this seems to have been the case. During that period, however, the variability has taken the direction of an omission of rainfall, and as a result the members of the population, considerable in number, whose entire subject of conversation is the weather, having to take a new line, find it less easy to maintain an even flow than in the days when the drip of falling water was there to provide an accompaniment.

The absence of conversational openings, the result of the drought, is, of course, most noticeable in the urban areas where precautions have been taken to guard against shortage of supply. In rural and outlying districts the situation is different, and in government and official circles the view taken steadily becomes more serious, and very real efforts have been, and are being, made in order to assist in securing and increasing supplies.

So far as the taking of serious views is concerned, the lay press has tried very hard to be helpful by indicating the terrible things that are happening, and predicting that though results even more terrible will occur if the drought continues, those that will ensue upon its termination will be catastrophic. Most of the effects, it is hardly necessary to say, are or will be upon the health of the people. The prevalence of infectious disease, in particular, the press believes to be certain to be affected.

Curiously enough, in spite of all journalistic effort, there has been little evidence of increase in the amount of infectious disease generally throughout the country. In some areas the number of cases of measles has been greater than in 1933, but this had been anticipated, and is in accordance with the character of this disease and the normal course of events. Scarlet fever in certain places has also been slightly more prevalent, but the rise here again is the ordinary periodic one. The fact that there appears to be an increase in the number of adults who have contracted this infection is one that has been the subject of mention. The explanation suggested for this is, of course, that as a result of the reduction in the amount and virulence of the disease during recent times, numbers of persons escaped infection in childhood, or if

they acquired it, had conferred only a transient and very minor degree of immunity.

So far as can be made out there has been no exceptional prevalence either general or local of enteric fever or intestinal complaints, though, as the press has suggested, this may appear when the drought really breaks and there comes the heavy and prolonged fall of rain that so many so very ardently desire.

THE SEASON OF CONFERENCES DRAWS NEAR

In spite of the drought, the slum clearance drive and everything else, preparations go steadily ahead for the various congresses and conferences that are held annually during the summer and early autumn months. Most prominently, of course, is the health congress of the Royal Sanitary Institute, which is fixed for July 9-14.

The venue on this occasion is Bristol, a city attractive of itself, historically and otherwise, and set in most pleasant surroundings. Recently it has come into prominence in public health circles on account of the setting up within the university of a department specifically concerned with preventive medicine and the carrying out of works of this type on behalf of the city, the main connecting link between the university and the municipality being the Medical Officer of Health (Dr. R. H. Parry) who has been appointed to the chair of preventive medicine.

The arrangements so far as the health congress is concerned are largely on the lines followed at the American Public Health Association conference, questions being grouped for discussion at appropriate sections or meetings of specialist officers. Housing and slum clearance being, as I have mentioned in previous letters, very much to the fore at the moment, will receive a great deal of attention, and the Minister of Health himself (Sir E. Hilton Young), no less,

has promised to attend and address the congress on some aspect of the housing problem.

Another matter exercising many minds at present is the problem of mental deficiency. This is to be discussed at a joint meeting of the preventive medicine section and the conference of medical officers of health.

LINKS WITH THE A.P.H.A.

The President of the Society of Medical Officers of Health (the individual who signs this letter) will preside over the meeting, and will have the support of, among others, Professor W. W. Jameson of the London School of Hygiene. Professor Jameson has only recently returned from a visit to India and the East, made at the instance of the Rockefeller Foundation, along with Dr. F. F. Russell, the Director. A further claim to particular distinction possessed by Professor Jameson is that he is the junior member of the small but very proud group of Honorary Fellows of the American Public Health Association in this country.

Talking of honorary fellowships, perhaps I might be permitted to refer to the great pleasure it gave me to be present at the meeting of the Royal Sanitary Institute when Professor Haven Emerson was elected an Honorary Fellow of that body. The honor of fellowship, such as it is, I am certain has never been more worthily conferred than in the case of Dr. Emerson, nor have I known a proposal that it should be offered received with greater warmth.

CHILD WELFARE AND TUBERCULOSIS

To return to the subject of conferences and congresses, I may note as a matter of interest that the usual annual conference on maternity and child welfare this year is to be held during National Baby Week in Birmingham from July 3 to 5. The

main subject for discussion is the causation of neonatal deaths. A report on the measures taken to reduce neonatal mortality and the results so far achieved is to be presented by Dr. G. F. McCleary. Dr. McCleary, who was formerly a Medical Officer of the Ministry of Health on the national health insurance side, has many friends in the United States, having visited and also, I understand, lectured on insurance questions in a number of medical schools and universities.

Other matters down for discussion at the conference are orthopedic work among preschool children; the new approach to social work, and the solution of nutritional problems. The maternity and child welfare group of the Society of Medical Officers of Health holds one session at the conference for

the purpose of discussing the prevention of tuberculosis in the child under 5.

For the more general consideration of questions relating to tuberculosis the National Association for the Prevention of Tuberculosis is to hold its annual conference—the twentieth of the series—in London on June 14 and 15. The conference is to take the form of an all-round discussion upon the experiences gained during the last 21 years as a result of the operation of the national tuberculosis scheme. Since the conference is to be in London, it may be anticipated that the gathering will be a particularly brilliant and representative one, and that contributions of great moment will be made to the discussion: even, perhaps, something in the nature of “pronouncements.”

London CHARLES PORTER, M.D.

EDUCATION AND PUBLICITY*

WHAT HEALTH EDUCATION IS

Public health education may be broadly defined as the act of making health information public by technics which arouse, stimulate, and guide motives for healthy living. It is the imparting of knowledge whereby the individual may understand what is his birthright in terms of health and longevity, and gain information of methods and facilities for preserving this birthright.

—Ira V. Hiscock in *Transactions of National Tuberculosis Association*, 1933.

More about Syracuse—In the March and April, 1934, issues we suggested the interest and value in the reports by Professor Winslow and Miss Bache on adult health education during the Syracuse Demonstration.

We also called attention to the absence from both reports of information as to the basis of a health education program.

The following from Dr. George C. Ruhland states very clearly the thought of the Commissioner of Health during the Syracuse Demonstration:

I feel that it is not quite just to Syracuse to say that the health program there proceeded without thought of the philosophy of health education and a program. Possibly we disagree with regard to what is meant by a philosophy or a program. So far as the Syracuse Health Demonstration is concerned, the program devoted its health educational work to the stimulation and promotion of a popular interest in recognized branches of public health activity. I do not conceive a program in public health as the promotion of only one major objective to the exclusion of other health needs—as—for example—to stimulate the building of a hospital or the establishment of special (tuberculosis) clinics. While these may be major objectives in a given health program, they manifestly cannot monopolize

the publicity so far as this is sought through the public press.

In fact, it is my philosophy that public health education must recognize that variation of the theme is most important if public interest is to be held—quite apart from the fact that papers will not be interested to publish stories on the same theme week after week and month after month. We must be opportunists in the publicity that we solicit for health education. I think you will get what I mean if you will ask yourself the question: "What should have been the program for Syracuse?"

The very fact that the Demonstration was conceived to apply all that was known and found worth while in public health practice made it of necessity a program with multiple features.

Questions about Adult Health Education—Some questions raised by Professor Ira V. Hiscock about health education addressed to adults:

Has our program been planned so that it will not be spread too thin in the effort to reach the whole public? Has the emphasis been properly placed as to subjects, and to groups to be reached? Have we featured health in too general terms and failed to stress specific topics? Have we used the most effective technics? Have we sufficiently tested our methods on a small scale before attempting an extensive mass education project? While we may not be able to answer all of these questions in this session, it would seem desirable that we periodically take account of stock, and consider more fully some

* Please address questions, samples of printed matter, criticism of anything which appears herein, etc., to Evert G. Routzahn, 130 East 22d St., New York, N. Y.

of the problems and the possible returns from the energy and funds expended in the name of public health education. . . .

Public health education should keep abreast of science, but never overstep the principles which have been established. Health facts can be presented clearly through simple words and obvious and attractive illustrations. Chief among the channels of instruction, to be later discussed, are newspapers, bulletins, folders, pamphlets, magazines, radio talks, motion pictures, exhibits, posters, and public addresses. These instruments, properly used, are all of assistance in their twofold object of securing popular support for the community health program, and of bringing into contact with physicians and other professional personnel the individuals who are in need of their services. "Mass methods of this kind form, however, only a first step toward the goal which is in view. Education in hygiene is after all a very personal matter. The kingdom of health, like the Kingdom of God, is within you" (Winslow). The personal contacts of the public health nurse and of other health workers, in many respects, constitute our most effective means of health education.

"The Philosophy of Health Education," *Transactions of National Tuberculosis Assn.*, 1933.

Honolulu Reports—From Hawaii comes one of the most interesting and effective of health agency annual reports. "Palama Settlement's 38th Year of Concern for Honolulu's Needful." Note the italicized phrase. An aerial map of a section of Honolulu covers most of the two cover pages with an unobtrusive insert of the Settlement buildings and an arrow pointing to their exact location. The title fills the space above the skyline of mountains at the top of the aerial view.

The contents are well selected, well laid out, and the story is told in terms of human beings rather than abstract phrases.

The open pages seem just right for the combined silhouette-outline sketches. The Wortman cartoon, a clinic interior from *New York World-Telegram* is available for use by any health agency. The 6 by 9½ inch envelope is given

distinction by broad bands of blue (about 2 inches wide) across each end in which "Palama Settlement" and "For the Promotion of Public Health and Social Welfare" appear in white letters.

"Aloha!" to Dr. Philip S. Platt, also the printer, and others who may be concerned.

Again "Yellow Jack"—Says Leon Whipple in *Survey Graphic* (May, 1934. 112 East 19th St., New York, N. Y.) about the play now being shown on Broadway:

Yellow Jack is not propaganda unless to inspire us in the ancient war of Man against Death. It is a significant experiment in translating to the stage a great moment in race history—the conquest of yellow fever in Cuba in 1900 by Dr. Walter Reed and his heroic colleagues of the Yellow Fever Commission. It is a success for with the simplest devices of stage levels and spot-lighting, it makes vivid and comprehensible this struggle of science and human courage, to audiences so absorbed that they do not notice there is no intermission. Here is one of the great forces of modern life, in shirtsleeves, gambling with death, the villain a tiny mosquito. Graphic scenes of emotion, humor, laboratory ritual unroll new understanding of how old and new schools clash, how doctors and plain men sacrifice life for other lives, what spiritual force it takes to ask such sacrifices, how the triumphs of science are mingled of the fanatic hunches of a Scotch Dr. Finley, the inspired imagination of a Walter Reed, the precise experiments of martyrs like Lazear.

Two Main Lines—The seventh annual report of Bellevue-Yorkville Health Demonstration says:

Broadly speaking, there are two main health educational methods which can be employed in acquainting the public with the teachings of preventive medicine, and in influencing them to seek medical advice and treatment. The physician, the teacher, the public health and clinic nurse, and the social worker—all these can do and are doing constructive and most effective work in the field of public health education. The work of these special agents can be supplemented by

a general campaign to popularize health knowledge through literature, meetings, radio talks, exhibits, newspaper, publicity, etc.

Public health education in the field of preventive medicine has generally employed both methods. A review of health educational campaigns would show that it was necessary to prepare for this work those who come in direct contact with the general public and, on the other hand, that it was important to carry on campaigns on a large scale by the written word in order to solidify these efforts and awaken the community to its responsibilities; for measures of prevention and control of preventable diseases have only succeeded as rapidly as public opinion was ready to support these measures, and general campaigns have helped to prepare public opinion for this.

Four pages in the 1933 mimeographed report outline the major campaigns carried on in 1933 and the publications issued. Bellevue-Yorkville Health Demonstration, 325 E. 38th St., New York, N. Y.

"Humanizing Education through Dramatization"—Under this title we are told that

Dramatics are the natural expression avenue of activity on the part of pupils. Humanized education through dramatization seeks to build around the child's instincts, impulses, and interests, and enrich his experiences through the interpretation of emotions. . . .

The aims and objectives of dramatization are divided into two classifications, information and entertainment. Each has its contribution to make to the curricular and extra-curricular activities of the school.

A swift survey of the types of the plays, pageants, and puppet shows reveals numerous published productions on the market. While these are elaborate in design and colorful in conduct, they definitely lack in the creative contribution an original performance by pupils has. . . .

The informal play given spontaneously makes a valuable contribution in vitalizing and humanizing the curricula. Here the teacher acts as a guide, encouraging and assisting. The responsibility and initiative rest with the group. The children select scenes, choose characters, and arrange equipment. The characters converse impromptu and gesture and move impulsively. The success of this type of dramatic activity will depend some-

what upon the child's experience and background in the pantomime, portrayal of moods, character sketch, and the tableau. An informal play affords excellent opportunity for cooperative group work. It stimulates interest in writing original plays.

The authors discuss briefly various dramatic forms: formal plays, pantomime, character sketch, tableau, pageant, puppet and marionette, and call attention to both disadvantages and advantages of the play medium for use with children. The emphasis is upon pupil-planning, but they grant that

Formal plays written for children have a place in the educational program. Their reproduction affects a form of study which may be correlated effectively with the subject matter studied. Such selected plays should be carefully considered in light of the richness of content and opportunities for forming correct concepts.

—by G. W. and N. D. Wright. *Educational Screen*, 64 E. Lake St., Chicago, Ill. April, 1934. 25 cents.

Health Education as in Boston—Author C. V. Wilinsky has sent us a copy of *The Health Units of Boston*, a report for 1924–1933 of the health centers conducted by the Boston Health Department, but financed by a private fund. The health education chapter says:

In the sense in which it is used in a health department "health education" means procedures that teach to the community ways of gaining and maintaining good health. As the economic conditions of a community become more and more a problem, the work of the health educator becomes a more vital factor. If the health standards of the city are to be maintained, if maternal and infant deaths are to be reduced, if there are to be fewer deaths and cases of communicable diseases, if the degenerative diseases are to be kept under control, health education must be carried on. People must be taught how to make the best possible use of the limited means available to them. They must be taught how to spend their money in a way that will keep them in good physical condition; to spend it so that their children will not suffer markedly from malnutrition. They must be taught how to

make their homes conducive to healthy living, in spite of the fact that, many times, more than one family must live in a small tenement. They must be taught scientific methods of preventing certain diseases and given instruction on healthful living in general.

How Boston makes the application is outlined in the report.

Value of Health Propaganda—Recently a session of the Section of Medical Sociology, British Medical Association, was devoted to this subject. Three papers, written from the point of view of (1) the administrator, (2) the practitioner, and (3) the press, "had been circulated beforehand among the speakers invited to join in this discussion."

The opponents of health propaganda appeared to object to it most strongly because it "accentuates that morbid absorption in his, or her, own health on the part of individuals, which is one of the worst vices of our time." Another speaker said that "To teach healthy habits to the young was valuable, but to make the young think about their health implied failure." And another warned against making hypochondriacs. There are several supporters of the belief that health services and treatment are in themselves adequate methods of spreading health knowledge.

Those who approved of propaganda argued on the ground of changed attitude of parents toward school medical service, the need for overcoming suspicion of employees toward the idea of periodic medical examination, and the necessity of keeping the public in touch with the progress of medical science. There is general approval of the use of the press.

"With Our Contributors"—Do we make the most of the personalities and the background of the contributors to professional and popular health

journals? Various general and special magazines give interesting notes about their contributors. They, too, usually bury such material where it must be searched for. What seems the better practice is that adopted by *Saturday Review of Literature*, New York, N. Y. Here the notes follow the articles in the form of a brief paragraph printed in italics.

Understanding The Child, Massachusetts Society For Mental Hygiene, Boston, Mass., is an example of a health periodical providing information about its contributors. But one must turn each time to a back page to learn about the author of an article.

"Contents" versus "Index"—The generally accepted form and location of the index and the table of contents is not followed in a number of public health reports. The customary use is to place "contents" at the front, and "index" at the back. The table of contents is a list in the order of appearance; the index is the indication, more detailed than the contents, under whatever classification in abc order will make it easily possible for the reader to locate whatever material he is looking for. Reports and other publications will be more usable and therefore more useful as these forms are followed.

A New Title for an Old Job—"Consultants in Social Work Interpretation" has replaced the exhibit division of the Department of Surveys and Exhibits as the covering title for the work of Evart G. and Mary Swain Routzahn, staff members of the Russell Sage Foundation. This is a change in name only and does not affect the nature of the work done. The exhibit, earlier recognized as an important tool for public education, has for some time been absorbed into the broader field of educational publicity in the Depart-

ment's studies. The exhibit division was originally started at the request of a group of national health and welfare agencies, and the broadening of the work was in response to the rapid evolution of education and publicity in all of those fields.

Fifty West Fiftieth Street—This address is now to be substituted for 450 7th Avenue which has been given here so many times for various national health agencies which have been housed for so long in one office building.

Popular Books on Health—"Books Of General Interest For Today's Readers"—has been

. . . prepared to meet the demand for a list of simply written, informative, and readable books suitable for use in connection with the current adult educational activities being conducted by the government and other agencies. . . . The widespread distribution of this list has been made possible by the generosity of the General Education Board.

Under "Health" are listed: "The Care and Feeding of Adults," by Clendenning; "Our Common Enemy: Colds," by editors of *Fortune*; "Yourself and Your Body," by Grenfell; "Eat, Drink and Be Healthy," by Lieb; "Diet and Health," by Peters; "Health Through the Ages," by Winslow and Hallock; "Family Food Supply," and "Three Meals A Day," Metropolitan Life Insurance Company.

Copies from American Library Assn., 520 N. Michigan Ave., Chicago, Ill. 25 cents.

What do you think of this list for its stated purpose? Would your list vary from the above?

SCHOOLS AND CHILDREN

"Light and Shade" is a chart to accompany "Health Through the Ages," both issued by Metropolitan Life Insurance Co., New York, N. Y. A picture record from "Prehistoric

Times: The Ages of Fear" down to the "Period of Rapid Scientific Advance."

Yellow area represents the gradual progress man has made in acquiring and applying scientific knowledge, in advancing health, and lengthening life.

Blue area represents gradual decrease in superstition, in reliance on magic and incantation, and in guesswork in dealing with problems of sickness and health.

"Health Instruction in Grades IX-XII," by J. F. Rogers, M.D., Office of Education. 22 pages. Supt. of Documents, Washington, D. C. 5 cents. A readable review of "the struggle of hygiene for a place in the high-school program," and the present status of health instruction.

The tentative list of topics for *Health Bulletin for Teachers*, 1933-1934. Metropolitan Life Insurance Co. *Free*. Sept., You and Your Community; Oct., The Water We Use; Nov., The Wastes of the City; Dec., Your Milk Supply; Jan., Your Food and Your Drugs; Feb., Working Together to Control Germ Diseases; March, The Health of the Child; April, The Health of the Teacher; May, The Doctor, the Dentist, and the Nurse; June, The Year's Progress in Health.

LEST WE OVERLOOK

Statistical Bulletin, Metropolitan Life Insurance Co., New York. Monthly review of varied health statistical data. *Free* to health and social workers, physicians, economists, statisticians, actuaries, editors, and libraries.

"Health," a department in *The Survey*, 112 East 19th St., New York. A midmonthly department on public health for social workers edited by Mary Ross. \$3.00 per year. Sample *free*.

EDUCATION AND REFERENCE

The most usable and easily available set of examples of diverse types of charts and diagrams is supplied upon

request by Merwin-Davis, 144 E. 86th St., New York, N. Y. There are 7 sheets, 8½ by 11 inches, carrying classified examples: bar and column charts, line and surface charts, circle diagrams, decorative charts, miscellaneous charts, maps, uses for charts. "Bar and Column Charts" includes 24 examples, including 4 samples of spacing.

When they were first issued in 1933 we overlooked an exceptional series of sex education booklets issued by American Medical Assn., 535 N. Dearborn St., Chicago, Ill. Written by Thurman B. Rice, M.D., the titles make clear the contents to which engraver and printer have given an attractive setting: "The Story of Life for Boys and Girls of Ten Years"; "In Training—for Boys of High School Age"; "High Life Goes On and On—for Girls of High School Age"; "The Age of Romance"; "The Venereal Diseases." 25 cents; set for \$2.00.

"Mass Education," by Bertrand Brown. Milbank Memorial Fund, 40 Wall St., New York, N. Y. 30 pages. 25 cents. Reprint from *Quarterly Bulletin* of the Fund. Reviews the main elements in mass education, and their use in adult health education. *Only a few copies left.*

"American Vitality Maintained in 1933" is treated in *Statistical Bulletin*, Metropolitan Life Insurance Co., New York, N. Y. Jan., 1934. *Free.*

Nursing service anywhere, of any type, under any auspices may use to advantage illustrative material offered by N.O.P.H.N., 50 West 50th St., New York, N. Y. A poster on paper (20 cents) or on card with easel back (30 cents), 14 by 24 inches. Less 5 cents each for 12 or more. Four half-tones, 2¾ by 3½ inches, each \$2.50, or glossy prints 7½ by 9½ inches, same subjects, 50 cents each. Ask for illustrated folder.

"Maternal Mortality in New York City," by Ransom S. Hooker, M.D. Abstract of the report which attracted

so much attention. Reprint from *Health Examiner*. New York Academy of Medicine, 2 E. 103d St., New York, N. Y. 10 cents.

"Health Services Tomorrow and Factors Determining Them," by Dr. Thomas Parran, Jr. *Public Health Reports*, Washington, D. C. April 13, 1934.

"Publications on Preventing Blindness." 1934 list of publications. National Society for the Prevention of Blindness, 50 W. 50th St., New York, N. Y. *Free.*

"Answering the Call," a visiting nurse poster in color, with "When you are sick send for the Metropolitan Nurse." Metropolitan Life Insurance Co., 1 Madison Ave., New York, N. Y.

From the Metropolitan Life Insurance Co., 1 Madison Ave., New York, N. Y., comes a new edition of "The Baby." With a delightful baby face on the cover; 31 pages of text; and an index. *Free.*

"Diphtheria," with 2 pages of carefully selected, essential information, clearly presented. Metropolitan Life Insurance Co., 1 Madison Ave., New York, N. Y. *Free.*

American Social Hygiene Assn., 50 W. 50th St., New York, N. Y., offers the following:

"Choosing a Home Partner," by N. W. Edson. 11 pages. 10 cents.

"Health for Girls." 14 pages. 10 cents.

"The Question of Petting," by M. J. Exner. 13 pages. 10 cents.

"Sex Education in the Home," by H. W. Brown. 14 pages. 10 cents.

"The Social Hygiene Program—Today and Tomorrow," by C.-E. A. Winslow. 24 pages. 10 cents.

HONORABLE MENTION

To Quebec Provincial Bureau of Health: for a limited "Table of Contents" in annual report.

To Milwaukee Health Department:

for an annual report which does not look like the output of an "official printer," and which has both "Contents" and "Index," and includes a section on "Health Education."

LANTERN SLIDES

A series of 13 charts on "Gonorrhea in the Male," available in miniature for 10 cents a set, are now issued as lantern slides, for sale or rental. American Social Hygiene Assn., 50 W. 50th St., New York, N. Y.

MAGAZINE ARTICLES

Here is background material; quotable matter; suggestions as to style and organization in writing.

"Marie Stopes, Crusader," by P. Allen. *Pictorial Review*. April, 1934. Sketch of the British Museum lecturer on paleontology who overthrew tradition so that the Ministry of Health now supervises birth control clinics.

"Arms and the Men." *Fortune*, 350 E. 22d St., Chicago, Ill. March, 1934. \$1. A devastating factual statement (illustrated) of munitions making as a chief source of war making. "Their axioms: (a) prolong war, (b) disturb peace."

"The Chicago Epidemic." *New Republic*, 420 W. 21st St., New York, N. Y. Feb. 28, 1934. 15 cents. "Chicago is proud of its fire, its fair and its epidemic."

"Cinchora—Quinine to You"; "The Great Radium Mystery"; "State Housing: American Style." *Fortune*, 350 E. 22d St., Chicago, Ill. Feb., 1934. \$1. Background material beyond public health aspects.

"Consolidated Cows." *Fortune*, 350 E. 22d St., Chicago, Ill. May, 1934. \$1. Background material on milk and milk products distribution. Milk bottle illustration may suggest a cover design for a "milk issue" or pamphlet.

"A Dental Clinic on Wheels," by Helen Hall. *Journal*, National Educa-

tion Assn., Washington, D. C. March, 1934. Traveling clinic of Little Rock public schools. Illustrated. 25 cents.

"Food for Athletes—And for All," by H. Ripperger. *New York Times Magazine*. April 1, 1934. (In many public libraries.)

"Freedom to be Young," by Karl N. Llewellyn. *Today*, 152 W. 42d St., New York, N. Y. March 10, 1934. 5 cents. An understanding, but impressive statement of opposition to the Child Labor Amendment—and the answers.

"Getting Well Again," by M. M. Miller. *Delineator*. April, 1934. "Forethought and intelligent handling to avoid some of the pitfalls which result in prolonged difficulty for the (sick) child and for the family."

"Health against Odds," by Louis I. Dublin. *Woman's Home Companion*. April, 1934. "Since the beginning of the depression, when all sorts of values have been undermined if not destroyed, human life and health have stood up singularly unaffected." "A growing and very real hazard to the public health, however, now emerges from the economic situation."

"Heap Bad Medicine," by J. Mitchell. *New Republic*, New York, N. Y. Nov. 8, 1933. The fight against legal control.

"Paying Doctor's Bills," by Mary Ross, public health editor of *The Survey*. In *Today*, 152 W. 42d St., New York, N. Y. March 17, 1934. 5 cents. "Is medical care to continue as a private business arrangement or become a social right?" With full page illustration: "America meets the needs of every economic class in education and public safety. Full medical service as well must be brought within the reach of all to complete the circle of social protection."

"Public Health and Private Doctors," by D. L. Worcester; "Nurses Show the Way," by C.-E. A. Winslow;

"Sickness and the New Poor," by Edgar Sydenstricker; "Change Comes to the Doctor," by M. M. Davis; and numerous illustrations appear in *Survey Graphic*, 112 E. 19th St., New York, N. Y. April, 1934. 30 cents.

"The Safe Prenatal Diet," by Dr. Kate Daum. *Herald-Tribune Magazine*, New York, N. Y. Feb. 25, 1934.

"Tramp, Tramp, Tramp, the Girls Are Marching," by Margaret Fishback. *Delincator*. April, 1934. "Another point in favor of walking, as our country's fad for 1934. It's as convenient and thrifty as it is healthy and smart."

"Wasting Women's Lives," by H. H. Smith. *New Republic*, 421 W. 21st St., New York, N. Y. March 28, 1934. 15 cents. "The frightful toll of abortion."

"Who's Who in the Drug Lobby," by James Rorty. *Nation*, 20 Vesey St., New York, N. Y. Feb. 21, 1934. 15 cents. Patent medicine connections of opponents of drug bills.

"Young Doctor Heat," by Paul de Kruif. *Ladies' Home Journal*. April, 1934. "Old Doctor Sun is the best physician I know, but when he is not on the job I'm beginning to bank on his assistant, Young Doctor Heat."

NEW

At least new to us: *Chats*, Division of Public Health Nursing, State Dept. of Health, Albany, N. Y. Book shape; mimeographed; undated; 35 pages.

BULLETINS

Attention is called to the monthly *Bulletin* issued by the American Society for the Control of Cancer, 1250 6th Ave., New York, N. Y. The 12 pages monthly contain short practical articles written by authorities as well as news relating to cancer research and cancer therapy. "It presents an easy and practical way of keeping abreast of cancer control progress." \$1.00 a year; a sample free upon request.

It seems a pity that "Mark Time" and his pal, "Ben Hustler," should be limited to the fairly exclusive audience provided by *Public Health News*, New Jersey State Dept. of Health. Would it be worth a test to send this copy to the newspapers of the state in advance of publication in *Public Health News*?

"Meeting the Challenge of Rural Public Health," by Elma Rood, is a feature running in *Bulletin*, Kentucky Board of Health, Louisville:

Elizabeth Baker, a public health nurse, working in a pioneer field in far away Michigan, exchanges letters with her good friend and old schoolmate, Frances Brown, a rural teacher in the mountains of Kentucky. Each tells the other how a challenge in public health is being met and answered in their respective states.

"The Babies," with quotation from Mark Twain; "Prosperity Babies," "Ten Years of Combat with a Foe of Happy Childhood" (diphtheria), "Babies and Tuberculosis," "Safe Milk for the Babies," "The Baby's First Birthday," and a display page about diphtheria make up an effective "baby number" of a health department bulletin, with good use of local statistics and service information. This March, 1934, number of *Health*, Dept. of Health, New Haven, Conn., carries the following on the cover:

New Haven possesses all the facilities necessary to the safeguarding of the new-born infant and the preschool child. The reason our prosperity in Baby Welfare has not as yet reached its full fruition is because parents do not fully understand or utilize the varied opportunities.

Michigan Public Health, State Dept. of Health, Lansing, is one of the bulletins making good use of excellent copy first appearing in other bulletins, much of which is too useful to be limited to one city or state.

Santa Barbara, Calif., *Bulletin* used a large mimeographed "dollar" to show

how the medical-health dollar is spent. "Prevention or Cure—Which?"

"Hunger for Health Facts," by Iowa State Dept. of Health, Des Moines, tells what was wanted by 1,034 people at the State Fair. More than 15,000 pieces were requested. Washington and New York were among the outside states represented.

"Recovery and the Health Department," by D. J. Sullivan. *Health Bulletin*, New Jersey Tuberculosis League, Newark, N. J. March-April, 1934.

MOTION PICTURES

How to get that local motion picture is told in "Featuring a County Health Program in Motion Pictures," by L. C. Coleman, M.D., in *Bulletin*, State Board of Health, Louisville, Ky., Jan., 1934.

The Madison County Health Department has recently inaugurated an additional educational feature, in the form of a film designed to give a complete motion picture of the whole public health program in the county. This film, which is in two reels and is the production in which Dean Rumbold of the Eastern State Teachers College rendered invaluable assistance, has been altogether financed by the civic and women's clubs of Richmond and Berca, with no iota of pecuniary expense to the Health Unit, the county or the state. It constitutes a résumé in pictures, with appropriate titles and reading material, of all the different activities of the Health Department.

At this writing, the film has been shown to 8 different audiences, and there are numerous appointments for showings after the first of the year. The measure of enthusiasm which it has so far uniformly elicited would seem to justify the confidence that, in this film, we have an addition to our educational program which will materially assist in bringing about an even greater degree of coöperation than now exists between the citizens of Madison County and the Health Unit.

"Street Safety — for Advanced

Grades," and "Street Safety — for Primary Grades," are two new pictures by Eastman Teaching Films, 343 State St., Rochester, N. Y. 16 mm silent; outright sale only.

"1,000 and One" is the 1934 edition of "the blue book of non-theatrical films, their producers and distributors. Includes "Physiology, Health and Hygiene." *Educational Screen*, 64 E. Lake St., Chicago, Ill. 75 cents.

REPORTING

"Milwaukee's Health—1933" is the cover text of an especially pleasing annual report of 20 pages with cover. The ivory paper, frequent headings, selected illustrations, diagrams, and tables promise to serve this stated purpose:

This condensed report of the Milwaukee Health Department is published for the use of individuals and organizations interested only in general health information.

More detailed information may be obtained from complete reports filed in the Health Department, Municipal Reference Library and with the Mayor and Common Council.

An even more condensed report appears in the March, 1934, issue of *Bulletin*, Milwaukee Health Department.

"Reflections of 1933," and a baby picture with its reflection in the background, make up the cover of the annual report of the National Society for the Prevention of Blindness, 50 W. 50th St., New York, N. Y. "Highlights of 1933"; no financial statement; 8 pages and cover.

"Union Health Center" is a small booklet reviewing 20 years' history and the services offered by this center which is maintained by two score labor unions. At 131 E. 17th St., New York, N. Y.

BOOKS AND REPORTS

Hygiene of the Mind—By *Baron Ernst Von Feuchtersleben*, Translated from the German by *F. C. Sumner, Ph.D.* Introduction by *Dr. Esther Loring Richards*. New York: Macmillan, 1933. 150 pp. Price, \$1.25.

This unique volume represents a series of essays written by a physician about 100 years ago. The author, as these essays clearly show, in addition to being a physician, was also a philosopher and poet. He was, in a very unusual way, an observer and went far in his interpretation of what he saw. He was not held down, in his efforts to understand the human being, by the limitations of the scientific store of knowledge as it then existed.

Of particular importance to those interested in mental health is the author's recognition of the very significant rôle played by the mind in what were ordinarily considered "physical diseases." He strongly emphasizes the rôle played by the will, emotions, and intellect as causative factors both in sickness and in health. The author's belief in the power of the will to cure almost any physical disease frequently broadens to the extreme. His emphasis on these forces is so strong that one wonders how a man trained so thoroughly in "physical medicine" was able to observe so well and reason so clearly on the psychological aspects of man's health. One cannot fail to admire the author's courage in presenting so forcefully these psychogenic aspects, particularly at a time when they were so little understood, and not recognized as they have been in recent years as very potent forces in both health and disease.

He also gives an important place to

religion and the efficacious part that it does or should play in the lives of human beings.

His suggestions for the maintenance of mental health are general in character, but the details as to how his suggestions should be carried out specifically can be filled in, to some extent, from our more recent knowledge, particularly that contributed by the psychoanalytic school. In this connection he discusses at some length the neurotic and particularly the hypochondriac.

This volume will prove interesting and stimulating to those interested in the historical background of mental hygiene. Surprisingly enough, the term "mental hygiene" occurs several times in these essays. The book is a translation of the third German edition of 1910. The author's style is very clear and the translator, without doubt, has contributed in no small way to the literary style that enhances its value to the reader.

FRANK J. O'BRIEN

Chronic Nephritis and Lead Poisoning—By *L. J. Jarvis Nye, M.B., Ch.M.* Sydney: Angus & Robertson, Ltd., 1933. 145 pp. Price, \$4.00.

The author claims to have brought to a logical conclusion the recent report of a Federal Inquiry into this subject in Queensland, but which investigation was not finished, apparently due to pressure of vested interests in the lead industry. As far back as 1892, Turner called attention to juvenile nephritis in Brisbane children. The subject was subsequently related to lead poisoning by Gibson in 1904.

The 5 chapters concern themselves with: (1) chronic nephritis in young people in Queensland, (2) lead poison-

ing in childhood in Queensland, (3) the relation between chronic nephritis and lead poisoning, (4) the source of the lead poisoning and its association with the chronic nephritis described, and (5) the problem for preventive medicine.

As a contribution to medical science the publisher claims this is perhaps the most important work to come out of Queensland since Bancroft discovered the adult filarial worm 57 years ago.

Every inhabitant of a wooden house in any part of the world should know something of lead paint and especially its liability to poison children. In the hot, tropical sun, but also in heated periods of the year anywhere, lead paint on exposed surfaces tends to powder very readily so that on walls, veranda railings and fences, it rubs off like chalk. Children contacting same, and especially children given to the habit of nail-biting and thumb-sucking, sum up the hazard.

The conclusions of Allbutt in the lead-arterial tension controversy in 1914 are amply supported in the present report. Lead is a vascular sclerosing agent.

The author blames apathy, "domestic deafness," and "social blindness" for doing nothing about it. "Were a new poison used in the manufacture of paint, the story would be entirely different . . . the extreme care to prevent poisoning from the new compound, ethyl lead, in motor spirit, is an excellent example."

Other factors commonly contributing to juvenile nephritis in Queensland are discussed in detail and dismissed one after the other, as hot sunlight on white-skinned people, the various acute infections, rickets, etc. The death rate from chronic nephritis in young people in Queensland (322 per 100,000 population) is unusual. From 1915 to 1930, there were 349 patients suffering from plumbism admitted to the wards of the Brisbane Children's Hospital. Female dependents, domestics, and male in-

dustrials were found to lead nephritis deaths in 9 occupational groupings—especially the first named; also, the poorer classes.

"These children have characteristic appearance with pallid, wizened features, dry and unnourished skin, and stunted physical development." Dwarfism is especially prominent. Cases commonly reach the mid-period of chronic lead poisoning even before investigation. Clinically, the most obvious sign is anemia, but all the other signs and symptoms of lead poisoning occur—the paralysis usually occurring in the legs rather than arms. Fortunately, cases have materially decreased since about 1926, attributed to education, earlier recognition, and the introduction of non-poisonous paints.

It seems paradoxical that commercial firms should take precautions in the care of their employees, whereas there should be such entire neglect of preventive measures against powdery lead paint. Probably it is because child life is outside of the practical gambit of commercial enterprise in which ill-health, sick benefits and compensation occur.

The reviewer would point out the all-too-frequent case reports of lead poisoned babies from paint and enamel on cribs and toys in America.

The present book is replete with tables, graphs and half-tones. It is written in a masterful but only semi-technical style, with conclusions at the end of each chapter and an extensive bibliography. There is no index but the table of contents is clear and the several pages of preface should not be overlooked.

E. R. HAYHURST

Nursing History—By Minnie Goodnow. Philadelphia: Saunders, 1933. 517 pp. Price, \$2.00.

When we received this book for review we looked at it and groaned "Another history of Nursing!" But we

had no sooner read a few pages than our spirits began to be lifted. For here was a history that did not dwell interminably on the details of nursing and medical practice back in ancient and medieval times, but discussed homely and human things to show the trend of the care of the sick up through the ages. For instance, the following subjects are discussed in rapidly moving paragraphs in the first chapter: "Nursing Among Animals," "Care of the Sick Among Savages," "Medicine and Theology," "Sickness and Sin."

For the first time we learned (and to remember) why the Crimean War was fought and who fought in it; what caused Florence Nightingale's long invalidism; when the medical profession first showed interest in nurses' training. We had never read of the Waltham Idea of training nurses before. The accounts of nursing in the Civil, Spanish-American, and World Wars were especially interesting.

The following statement made on page 253 left us in doubt as to what organization the author really meant, but we figured it must be the American Public Health Association: "The National Public Health Association openly proclaims its dependence upon the nurses of the country for the carrying out of its program."

The English is not as polished as it might be, but one gets a fine idea of the significant milestones in the history of nursing, and if we were a pupil nurse again studying history of nursing we would choose this text, for even after a long, strenuous day, we would find it too interesting to go to sleep over.

EVA F. MACDOUGALL

Growing into Manhood—By Roy E. Dickerson. New York: Association Press, 1933. 100 pp. Price, \$1.00.

A goodly proportion of books dealing with sex hygiene and written for young boys are mawkish and unconvincing,

largely, I suppose, because the authors themselves unconsciously share the public's rather shamefaced attitude toward sex. This book by Dickerson is not of that type. It impresses one as a straightforward attempt to talk sensibly and frankly with the boy as an older friend might to a younger one. The author does not falter and become obscure for fear of possibly offending. The presentation is almost uniformly clear-cut and convincing. The main theme is kept from over-emphasis by being made a part of general hygiene.

If one were to criticise at all it might be in the direction of suggesting that some of the anatomy and physiology may be rather difficult for the younger boys. Again, the section on alcohol and tobacco is not quite so well balanced as the rest of the book; although it must be confessed that a balance is not easily attained on a subject so full of controversial pitfalls, and especially in writing for boys whose heroes may be dads who might have to fall back on the old saw, "Do as I say, not as I do."

This book could be read with profit by many adults as well as by boys.

MERRILL CHAMPION

The Chinese Medical Journal, Nov.-Dec., 1933, Vol. XLVII, Nos. 11 and 12. Professor Fülleborn Memorial, Parasitology Number. Peiping, China: The Chinese Medical Association.

This number is a memorial to Professor Friedrich Fülleborn, Director of the Institute for Tropical Diseases at Hamburg, who died September 9, 1933. The editors explain that the necessity of publishing reports which are on the border line between parasitology and pure zoölogy in this journal is due to the fact that special journals on parasitology, microbiology, and pathology have not yet made their appearance in China.

The articles in this issue may be

divided into three groups; the first dealing with histopathology in relation to parasitic infections; the second devoted to infection with the *Microfilaria malayi*, which is here reported for the first time; and the third on Spirochaetoses. The articles show extensive research and careful study. The English is excellent throughout, and one cannot help feeling that the Chinese are far ahead of us in their use of languages. It is hard to imagine a series of articles written by Americans in Chinese which would be understandable to the people who speak and read that language.

The volume is abundantly and excellently illustrated. The Chinese Medical Association is to be congratulated in being represented by such a journal and such a group of investigators.

MAZÛCK P. RAVENEL

Diet and the Teeth. Part III. The Effect of Diet on Dental Structure and Disease in Man—By May Mellanby. *Special Report Series, No. 191.* London: His Majesty's Stationery Office, 1934. Price, 5s net.

In this third report of Mrs. Mellanby on vitamin D, a close study has been made of the histologic structure of dental tissues—normal and abnormal. Frequency and distribution of structural abnormalities from a large number of deciduous teeth, extracted and in situ, are noted. Charts have been compiled showing the frequency of caries on different surfaces, defects in relation to time of development, and variations in structure of different types of teeth in the same individual. Finally the association between imperfect structure and caries is shown.

A study of secondary dentine seems to show better structure and calcification when an adequate amount of vitamin D is available. Structure and calcification of secondary dentine is used as an index to the tooth's resistance to decay.

The geographical and racial distribu-

tion of caries has been a stumbling block to the vitamin enthusiasts, but Mrs. Mellanby has hit upon breast feeding as the caries immunizing factor common to these dentally favored people. As a matter of fact, this practice is stressed as the most important agent in the prevention of caries. The ground upon which this assumption is based seems a bit shaky. Granting that prolonged breast feeding is practised by some immune races in certain localities, the concomitance of events is hardly acceptable as scientific proof.

Anatomic defects, such as developmental pits and fissures, have always been recognized as the most important predisposing cause of a certain type of caries. If the claims made for correct diet are justified, this chink in the armor of the tooth could be eliminated. Unfortunately this theory does not solve the problem of cavities having their beginning on smooth surfaces.

The author of the preface cites as proving the value of the work the alleged fact that the White House Conference in 1930 accepted the nutritional effect on teeth as being the dominant factor in dental physiology and pathology, the implication being that Mrs. Mellanby's work was accepted without question. No reference was given, but we presume that the author referred to the *Growth and Development of the Child*, Part II. In that we find the statement that Mrs. Mellanby regards vitamin D as a specific factor in producing a perfect dentine. The summary of the chapter devoted to this subject says:

Vitamin B complex has only an indirect effect on the teeth by affecting the general nutrition of the whole organism. Vitamin C has a profound influence on the tooth pulp and formation of dentine. Vitamin D exerts a calcifying influence on the tooth pulp and the formation of enamel. The different angles of approach in studying the factors influencing teeth are perhaps the cause of apparent confusion in the evidence presented by various investigators. The profound influence

which the vitamins are known to have on the assimilation and utilization of available material is not yet completely worked out. The basis of the peculiarities of various species of experimental animals is only beginning to be appreciated as comparisons are made. Until these considerations are fully understood, the nutritional factors involved in the formation of sound teeth cannot be completely evaluated. It can be said without qualification, however, that nutrition is the most vital of all the influences deserving consideration.

Existing beliefs as to the causes of dental caries, branded the "mental contortion" in the preface, signed by the Medical Research Council, are disposed of in a high-handed manner, reminding the reader that clinical dentistry is apparently not represented in this investigation.

C. F. ELZEA

Kampfgaserkrankungen—(*The literature of pathology and treatment of chemical warfare gas diseases*)—By Dr. Otto Muntsch. (2nd ed.) Leipzig: George Thieme, 1934. 110 pp. Price, 9.6 Marks.

It is presumed that during the next period of major warfare, large groups of the civilian population may be subjected to the action of war gases. This prospect has prompted the author to seek the coöperation of Red Cross units throughout the world in the collection and appraisal of all possible information bearing on the prevention and treatment of injuries resulting from exposure to these toxic chemicals. The author states in substance, "with this point in mind the purpose of this book is to offer such knowledge as has been gathered from the different parts of the world as to ways and means for protecting the civilian population against the ravages of war gases."

In the several chapters are discussed such topics as the development of chemical warfare; the statistics derived from the late war; the general toxicology and classification of chemical fighting materials; the chemistry of outstanding

war gases; the special pathology and treatment of such war gases as phosgene, chlorpicrine, dichlor-diethyl-sulphide, leucite, arsine, the oxides of nitrogen, carbon monoxide, etc. One of the most attractive features of this book is the number of illustrations in color, presenting the clinical appearance of various types of affections following war gas exposure. In addition various illustrations in black and white and in color, present the results of animal experimentation, the appearance of various organs at autopsy, etc.

At this very time, this book holds only limited value in the practice of medicine. Against that day when thousands of persons may be attacked through the medium of gas warfare, this book contains all of the substantial information available to the best known means of preventing the malaction of war gases, the diagnostic treatment of these conditions when produced, together with extensive discussion as to the prospective effects following in the wake of acute damage after exposure to gas warfare materials.

CAREY P. McCORD

Municipal Year Book—By Clarence E. Ridley and Orin F. Nolling. Chicago: International City Manager's Assn., 1934. 256 pp. Price, \$4.00.

This is the first edition of a year book for American Cities, and purports to be "an authoritative resumé of activities and statistical data of American Cities." Studies on Municipal Government in its different phases are being made on a wide scale due to a desire to discover what are the indispensable functions in city government and what are the most effective methods of administration and, more particularly, at the present time to find out how economies can be effected.

This book will be a decided help to all engaged in such studies, and valu-

able generally as a reference book. A directory may soon get out of date, but an up-to-date one, as the year book apparently is, is a convenience and a great time saver.

The concise articles by experts in different fields of municipal activity setting forth the outstanding changes which have taken place during the year are informative and especially valuable by busy workers. The brief review of the public health field is prepared by Dr. W. F. Walker, formerly Field

Director for the Committee of Administrative Practice of the American Public Health Association and now with the Commonwealth Fund. His wide acquaintance with health organization and public health activities enables him to give trustworthy opinions as to the main trends in public health.

There is appended to the *Year Book* a selected list of recent books and periodicals which is most useful as a reference list. JAMES WALLACE

BOOKS RECEIVED

MATERNAL MORTALITY AND MORBIDITY. A Study of Their Problems. By J. M. Munro Kerr. Baltimore: William Wood, 1933. 382 pp. Price, \$8.25.

YOU MUST RELAX. By Edmund Jacobson. New York: McGraw-Hill, 1934. 201 pp. Price, \$1.50.

SURVEY OF PUBLIC HEALTH NURSING. Administration and Practice. By the National Organization for Public Health Nursing. New York: Commonwealth, 1934. 262 pp. Price, \$2.00.

BRUCELLA INFECTIONS IN ANIMALS AND MAN. Methods of Laboratory Diagnosis. By I. Forest Huddleson. New York: Commonwealth, 1934. 103 pp. Price, \$2.25.

JAPANESE MEDICINE. By Y. Fujikawa. Translated by John Ruhrah. New York: Hoeber, 1934. 114 pp. Price, \$1.50.

YOUR GERMS AND MINE. The Story of Good and Bad Microbes. By Berl ben Meyr. New York: Doubleday, 1934. 389 pp. Price, \$2.75.

INTRODUCTION TO FOOD BACTERIOLOGY. By Andrew Moldavan. Lancaster: Science Press Printing Co., 1934. 172 pp.

THE STORY OF THE NATIONAL LEAGUE OF NURSING EDUCATION. By Helen W. Munson. Philadelphia: Saunders, 1934. 80 pp. Price, \$1.00.

THE MUNICIPAL YEAR BOOK 1934. An Authoritative Resumé of Activities and Statistical Data of American Cities. Editors—Clarence E. Ridley and Orin F. Nolting. Chicago: International City Managers' Association, 1934. 256 pp. Price, \$4.00.

A SELECTED PUBLIC HEALTH BIBLIOGRAPHY WITH ANNOTATIONS

Improving the Britisher's Health—Successes and accruing benefits of the British system of health insurance are recounted by a leader of the British Medical Association. The paper should be read by everyone interested in preventive medicine.

BRACKENBURY, H. B. Health Insurance in England. *New Eng. J. Med.* 210, 16:851 (Apr. 19), 1934.

Investigating Tuberculosis Contacts—The examination of family contacts, as a tuberculosis case finding method, should be confined to a more highly selected group of families, made after a detailed clinical study of the primary case. Otherwise, the method may prove a relatively poor case finding procedure.

DOWNES, J. Tuberculosis Case Finding in the Red Hook Area of New York City. *Milbank Quart.* 12, 2:134 (Apr.), 1934.

Sewage Treatment—Briefly reviewed to make a useful and informing summary of the latest methods of sewage disposal, this paper will give the sanitarian the knowledge he should have to be up-to-date.

EDDY, H. P. Recent Developments in Sewage Treatment. *Sewage Works J.* 6, 2:262 (Mar.), 1934.

Health Instruction Reduced to Its Rudiments—This experience in social hygiene education for Negroes in the City of New Orleans has much in it that can be adapted to other health promotion projects.

EDWARDS, M. S. Popular Health Education in Simplest Terms. *J. Social Hyg.* 20, 4:177 (Apr.), 1934.

Health Facts to Be Unlearned—In this long list of 23 health "beliefs," some of which are taught and some handed down with the family china, you

are almost sure to find a few which will affront your own pet delusions. This paper should be required reading for all sanitarians and would-be health teachers.

FORSYTHE, W. E. Things to Forget in Health Teaching. *Health and Physical Education.* 5, 3:18 (Mar.), 1934.

Stability of Brucella Strains—Passage of bovine strains of Brucella through several series of hogs caused no determinable change from the bovine to the porcine type.

GILMAN, H. L., *et al.* Passage of Bovine Brucella Through Swine. *J. Infect. Dis.* 54, 2:171 (Mar.-Apr.), 1934.

Hopeful Cancer Results—The percentage of cures in cancer of the breast has improved (in Massachusetts). Further reduction in mortality depends chiefly upon public education and the prompt and proper treatment of any abnormality of the breast.

GREENOUGH, R. B., *et al.* Cancer of the Breast; End Results (Two Papers). *New Eng. J. Med.* 210, 16:831 (Apr. 19), 1934.

Parrots or Parrot Fever—We know little more about the intrinsic nature of psittacosis today than we did 2 years ago; the fight is not yet won; and efforts to suppress the disease meet with constant opposition and are attended with many difficulties: so concludes this excellent survey of the whole subject.

HOCHE, V. M. Psittacosis in the United States. *Pub. Health Rep.* 49, 14:451 (Apr. 6), 1934.

Better Swimming—Improvements in swimming pool management are set forth in sufficient detail to make the matter understandable by all sanitarians.

HYATT, C. A. Swimming Pool Sanitation. *Municipal Sanitation.* 5, 4:116 (Apr.), 1934.

Importance of Child Care—In England improvement in death rates of various age groups depends upon the date of birth. This finding is consistent with the hypothesis that the important factor in health during the whole life is the environment up to age 15, and that improved conditions in later years have little effect.

KERMACK, W. O., *et al.* Death Rates in Great Britain and Sweden. *Lancet*. 226, 5770:698 (Mar. 31), 1934.

The Future in Health Administration—The health service of tomorrow will conform inevitably to the governmental framework whatever that may be. If the previous political philosophy prevails, the traditional forms of health administration will continue, improved it is to be hoped. If the current economic changes move to the left, we shall see old age, unemployment, sickness and other schemes of social insurance. Whatever happens, we shall have little to say about it and must conform.

PARRAN, T. Health Services of Tomorrow. *Pub. Health Rep.* 49, 15:477 (Apr. 13), 1934.

Health of the Recent-Poor—“Comparisons among various groups of the surveyed population indicate that the ‘depression poor’ obtained more free care of all kinds, less total physician’s care, more total hospital care, and more care by a visiting nurse than was received by their neighbors who were in similar economic circumstances in 1929 but did not suffer material loss of income during the depression.

PERROTT, G. St. J., *et al.* Medical Care During the Depression. *Milbank Quart.* 12, 2:99 (Apr.), 1934.

How Many Public Health Nurses Are Needed?—Unfortunately you will not find an answer to the question in this paper. You will find, however, sug-

gestions about ways in which an answer may sometime be reached.

RANDALL, M. G. How Many Public Health Nurses Are Needed? *Milbank Quart.* 12, 2:160 (Apr.), 1934.

More Babies for the New-Poor—“Low social status, unemployment, and low income in 1932 went hand in hand with a high illness rate and increased malnutrition among children. It was in these same groups of families that a high birth rate prevailed . . . in families which could least afford, from any point of view, to assume this added responsibility.”

SYDENSTRICKER, E. and PERROTT, G. St. J. Sickness, Unemployment and Differential Fertility. *Milbank Quart.* 12, 2:126 (Apr.), 1934.

Tubercle Filtrates—It seems that the Berkefeld filtrate of tuberculosis cultures injected into animals produces certain atypical non-progressive infections. This convinced some research workers that they were dealing with an ultra-virus. These authors added to the same filtrate a few tubercle bacilli which produced exactly the same condition. Hence, they infer that it is necessary to assume, instead of an ultra-virus, that a leaky filter may have been at the bottom of the phenomenon.

WALKER, E. L. and SWEENEY, M. A. Microscopic Demonstrations of Acid-Fast Bacilli in Tuberculosis Filtrates. *J. Infect. Dis.* 54, 2:183 (Mar.-Apr.), 1934.

Predisposition to Cancer and Insanity—There may be some consolation in learning that if you are marked for insanity, there is less likelihood that you will develop cancer than if you are destined to remain outside the asylum, for cancer is definitely less frequent among the insane than the general population.

WARREN, S. and CANAVAN, M. M. Frequency of Cancer in the Insane. *New Eng. J. Med.* 210, 14:739 (Apr. 5), 1934.

ASSOCIATION NEWS

AN OPEN LETTER TO THE MEMBERSHIP FROM THE PRESIDENT OF THE ASSOCIATION

DEAR MEMBER:

Now is the time to determine your own Pasadena plans. The annual offering of the science and art, of theory and practice, of philosophy and news in preventive medicine, is ready for your consideration.

Exchange of useful facts, diversity and discussion of opinion, agreement on policies and methods are best accomplished face to face and eye to eye.

Read the provisional program (to be published in the July issue), and be persuaded of the compelling worth of its multitudinous topics, and be tempted by the privilege of asking and answering questions among your professional peers, to attend the Pasadena meeting of our Association.

All Members and Fellows west of the Mississippi will find this their nearest and dearest opportunity.

Distance will add enchantment for those who by accident of birth and occupation are called Easterners. To these in particular it should be said that travel to the coast never cost less than it will this summer, and no previous western meeting of the Association has been sponsored by so numerous, so well organized, or so hospitable a group of regional hosts as welcome us now to California.

General meetings will emphasize the social and international problems of American public health, current experiments in public service, and the increasingly intimate dependence of our security upon health in the other continents and nations.

As is often the case, laboratory

leaders offer us progress and promise in many lines. Meyer of the Hooper Laboratories reveals the enigma of mussel poisoning; H. W. Hill, the veteran sanitarian of Vancouver, brings wisdom on milk; the Smiths tell of fluorine, the new criminal in water supplies; and Sippy brings us to time with new light on dysentery; Pearl Kendrick brings the new pertussis technic from Grand Rapids; and Sara Branham advances information on meningitis.

Official commissions in Chicago, and A.M.A. meetings in Cleveland, and many individual inquiries by correspondence and personal visit have left many questions on amebic dysentery to be answered by national authorities at our symposium.

New Mexico, San Francisco, and Minneapolis will make additions to our knowledge of syphilis control.

School physicians will be drawn by their confidence in the ability of Shepard, Pratt, Gudakunst, and others, to give them fact and method to raise the quality of child health.

Young of Lansing on immunity to diphtheria; Kellogg of Berkeley on bacillary dysentery; Bonyng of Los Angeles on streptococcus epidemicus; Meyer of San Francisco on psittacosis, compete with other well known authors for attention in diagnostic and preventive procedures.

Tuesday morning will, in fact, be a General Session because of the universal professional and public interest in the program on Serving the Public for Health. This will doubtless be the

Health Officers' banner event, planned in a spirit of competition in well-doing, not as a controversy between partisans.

Australia, Tennessee, and New York City will lay their experience at the feet of the health officers in other section meetings.

Occupational hygiene interests will center about the basic industries of oil, smelting, and lumbering, with original reports from Legge and others.

With Alonzo Taylor, Guy Millberry and Carl Alsberg dealing with nutrition, there will be crowded halls and eager listeners.

Child health has drawn its speakers from the Atlantic Coast to Hawaii—city and county official and nonofficial agencies.

For the epidemiologist in addition to the perennial problems of typhoid, syphilis, diphtheria, and scarlet fever from east and west, we have psittacosis,

particularly featured by Californians.

The Section Secretaries and the Program Committee offer a balanced feast of reason to whet our intellectual appetites. Come and share it and contribute as critical listeners and by your constructive discussions.

Come from near and far, come for your pleasure and for the profit of all of us.

Show your confidence in recovery by investing in this annual pilgrimage for public health.

Cordially yours,

HAVEN EMERSON, M.D., *President*

P.S. You will receive additional dividends on your investment in the form of good companionship and valuable professional contacts if you travel to Pasadena on the A.P.H.A. Special Train. If you have not received an invitation to join it, by all means inform the Association office in New York.

MAKE RESERVATIONS EARLY

IT will be necessary this year to use two hotels in Pasadena and the Civic Auditorium for section and general meetings. Since all the events of the Annual Meeting cannot be held under one roof and there will be considerable passage between the hotels, delegates will probably indulge their tastes this year so far as their personal headquarters are concerned more generally than at previous meetings when, for the most part, convention activities were centered in one hotel.

The principal hotels are listed below with their rates. The Vista del Arroyo, the Huntington and the Maryland are the best.

Registration and information, commercial exhibits, and certain section meetings will be held in the Maryland. The Huntington, too, will have some sessions and some luncheons and dinners. The Maryland is in the center

of the city; the Huntington is a 10 minute ride from the downtown area, set in its own beautiful 28 acre park. The Local Committee will provide transportation between the Auditorium and the Huntington, and between the Maryland and the Huntington, so that those wishing to surround themselves with unusual loveliness and comfort, such as the Huntington provides, may do so without sacrificing time and convenience.

The Maryland, too, is spacious and comfortable, with many attractive bungalows, surrounded with flowers and lawns, available for delegates in addition to rooms in the main building.

The best accommodations in both the headquarters hotels are double rooms. The number of single rooms is limited, and delegates are urged to make immediate reservations for them. Doubling up is recommended, in so far as possible.

PASADENA HOTEL RATES

The Maryland Hotel and Bungalows

(Capacity, 375 Rooms)

Single room, with bath, \$3.50-\$4.00
 Single room, without bath, \$2.50
 Double room, with bath, \$5.00
 Double room, without bath, \$4.00
 Bungalow rooms at same prices as Main Building rooms, \$4.00 additional for living room.

The bungalows vary in size, and consist of a living room and anywhere from 2 to 5 bedrooms, either with private bath or connecting bath, and these would make ideal arrangements for groups that would be congenial together.

The Huntington Hotel and Bungalows

(Capacity, 292 Rooms)

Single room, with bath, \$4.50
 Double room, with bath, \$6.00-\$7.50
 2 Single rooms, with bath, \$7.00
 Double and single rooms, with bath, \$9.00
 2 Double rooms, with bath, \$10.00

Hotel Green

(Capacity, 167 Rooms)

Single room, with bath, \$2.50
 Double room, with bath, \$3.00-\$3.50
 2 Single rooms, with bath, \$5.00-\$6.00

Hotel Vista del Arroyo and Bungalows

(Capacity, 400 Rooms)

Single room, with bath, \$4.50
 Double room, with bath, \$6.00-\$7.50

Hotel Constance

(Capacity, 164 Rooms)

Single room, with bath, \$2.00
 Double room, with bath, \$3.00

.....(Cut off on this line and mail to the hotel of your choice).....

HOTEL RESERVATION BLANK FOR PASADENA MEETING

AMERICAN PUBLIC HEALTH ASSOCIATION

50 WEST 50TH STREET, NEW YORK, N. Y.

SEPTEMBER 3-6, 1934

To
 (Name of Hotel)

Please reserve for merooms for.....persons
 for the A.P.H.A. Meeting.

Single room..... Double room.....

Bungalow for persons

Maximum rate per day for room \$......Minimum rate per day for room \$......

I expect to arrive..... If date of arrival is changed I will notify
 you at least 24 hours in advance.

Please acknowledge this reservation.

Name

Street address

City..... State.....

RAILROAD RATES TO PASADENA

The American Public Health Association applied this year, as usual, for reduced railroad rates on the convention basis of fare and one-third for the round trip to the Annual Meeting. The passenger associations have advised that summer excursion rates are more favorable and are in effect in most sections of the country. We are instructed to advise members to confer with their home ticket agents, who will be able to

give them detailed information regarding fares, routes, and Pullman rates.

This year you require no identification certificate in making your travel arrangements to Pasadena, since summer excursion fares are open to the general public.

The following lists 45-day, round trip, summer tourist fares to Pasadena and Los Angeles from principal points. Pullman charges are not included.

RAILROAD RATES FROM VARIOUS CENTERS TO PASADENA, CALIF.

45-Day, Round Trip Summer Tourist Fare to Los Angeles

<i>From:</i>		<i>From</i>	
Atlanta	\$100.65	Nashville	93.15
Baltimore	120.75	New Orleans	85.15 (1)
Boston	133.98	New York	126.90
Buffalo	109.55	Omaha	72.00 (1)
Chicago	86.00 (1)	Philadelphia	122.85
Cincinnati	97.00	Pittsburgh	107.10
Cleveland	101.35	Portland (Ore.)	45.95 (2)
Dallas	70.45 (1)	Salt Lake City	30.85 (2)
Denver	57.50 (1)	San Francisco	19.50 (2)
Detroit	98.30	Seattle	53.30 (2)
Duluth	86.00 (1)	St. Louis	81.50 (1)
Fort Worth	70.45 (1)	Washington, D. C.	120.75
Indianapolis	92.60	Montreal	122.55
Jacksonville	112.90	Halifax	149.20
Kansas City	72.00 (1)	Ottawa	121.05
Louisville	94.20	Quebec	129.60
Memphis	85.15 (1)	Toronto	108.15
Milwaukee	86.00 (1)	(1) Limit October 31	
Minneapolis	86.00 (1)	(2) Limit 10 days	

INTRODUCING THE CHAIRMAN OF THE LOCAL COMMITTEE ON ARRANGEMENTS FOR THE PASADENA ANNUAL MEETING

DR. J. D. DUNSHEE

WHILE the members of the Association know Dr. Dunshee's name very well for his work as Health Officer of Pasadena, and that he has recently been appointed Director of Public Health for the State of California, they will be interested to know the roads he has traveled to bring him to his pres-

ent post. If the following biographical material appears sketchy, his friends will know it is because he has insisted upon the removal of every adjective and every phrase that would seem to carry with it a suggestion of commendation.

Dr. Dunshee came to California in 1920. During that winter he conducted

a weekly conference at the *Los Angeles Evening Express* for children of pre-school age.

Following this, he was appointed Director of Child Welfare of the Los Angeles City Health Department, a position which he held for 5 years. He resigned from the Health Department and served as Executive Secretary for the Southern California Society for Mental Hygiene. He has been on the Board of Directors of this Society for the past 10 years, serving as President for 1 year. It is under this Board that the Child Guidance Clinic of Los Angeles and Pasadena is operated.

Dr. Dunshee organized the Normandy Avenue Nursery School operating under the Board of Education of the City of Los Angeles, and has been active in all movements having to do with child welfare.

While in Los Angeles, Dr. Dunshee was a member of the Southwestern Pediatrics Society, and for 2 years was on the Pediatrics Staff of the Los Angeles General Hospital.

Early in 1929 Dr. Dunshee was appointed Health Officer of Pasadena. For the past 5 years, since its inauguration, Pasadena has been one of the honor cities in the Inter-Chamber Health Conservation Contest, in cities of 50,000 to 100,000 population. For the year just completed, Pasadena was first among the honor

cities in its population class. It has been through Dr. Dunshee's efforts that health work in Pasadena has been organized in such a way as to receive this recognition. Dr. Dunshee inaugurated the Health Section of the Council of Social Agencies in Pasadena which has met monthly and has worked closely with the Health Department on health programs. The outstanding contribution which he made to health work in Pasadena was securing the coöperation and support of all health agencies in the city. He was also sent by the City of Pasadena as a delegate to the White House Conference on Child Health and Protection in Washington, D. C.

On March 17, 1934, Dr. Dunshee was appointed Director of the California State Department of Health, an appointment welcomed by health workers of the entire state. His new work has in no way detracted from his interest in the Pasadena Annual Meeting. As *Chairman* of the Local Committee, his energies and enthusiasm are unbounded. Dr. Dunshee is a Fellow of the Association.

ADDITION TO PASADENA LOCAL COMMITTEE

Dr. J. D. Dunshee, *Chairman* of the Pasadena Local Committee, announces that Dudley M. Dorman, of Los Angeles, has accepted the chairmanship of the Finance Committee.

NEW MEMBERS

The following list includes applicants who have been approved for membership in the A.P.H.A. by the Sub-Committee on Eligibility. These new members have requested affiliation with the sections indicated, and action by the Section Councils will follow.

Health Officers Section

James A. Dumas, M.D., 470 Broadway, Lynn, Mass., Public Health Commissioner
Herbert C. Hageman, M.D., 14 Fremont St., Gloversville, N. Y. (Assoc.)
William J. Maby, M.D., 515 Park Ave., Mechanicville, N. Y. (Assoc.)
Clyde R. Newell, M.S., 50 Hudson St.,

Hackensack, N. J., State District Health Officer
Irvin B. Trapp, M.D., Box 386, New Albany, Miss., Director, Union County Health Dept.
Frank D. Ursone, M.D., Norfolk, Conn., Health Officer
William D. Weis, M.D., Crown Point, Ind., County Health Commissioner

Lee J. Whittles, M.D., 351 Main St., Glastonbury, Conn., Health Officer

Laboratory Section

Gordon E. Davis, Sc.D., U. S. Public Health Service, Hamilton, Mont., Bacteriologist
Dr. Karl J. Demeter, Weihenstephan, Freising, Bavaria, Head, Bacteriology Dept., South German Research Institute of Dairy Science (Assoc.)

John H. Dingle, Sc.D., Upjohn Co., Kalamazoo, Mich., Bacteriologist

Mary A. Lynch, 4812 Fifth Ave., Los Angeles, Calif., Laboratory Assistant, City Dept. of Water & Power

Irwin M. Walker, M.D., Niagara Falls Memorial Hospital, Niagara Falls, N. Y., Director of Hospital Laboratory

Vital Statistics Section

Herbert H. Marks, A.B., 1 Madison Ave., New York, N. Y., Statistician, Met. Life Ins. Co.

Francis D. Rhoads, M.A., 1504 Alaska Bldg., Seattle, Wash., State Registrar

Mortimer Spiegelman, M.E., 163 Eastern Parkway, Brooklyn, N. Y., Research Clerk, Met. Life Ins. Co.

Victoria M. Trasko, 326 S. Main St., Wilkes-Barre, Pa., Statistician, Board of Health

Public Health Engineering Section

Howard R. Fullerton, C.E., State Dept. of Public Health, Nashville, Tenn., Assistant State Director of Malaria Control

William J. Lenz, M.D., Ph.D., 1346 Starks Bldg., Louisville, Ky., Consulting Chemist

Edgar B. Peebles, 1814 Cephas Ave., Nashville, Tenn., Dairy Inspector (previously Sanitary Officer)

Felix Seligman, Water & Light Dept., Duluth, Minn., Manager

Industrial Hygiene Section

Irving Gray, M.D., 41 Eastern Parkway, Brooklyn, N. Y., Member, Public Health Committee, Kings County Medical Society

Carroll Lockard, M.D., 10 South St., Baltimore, Md., Medical Director, Maryland Life Insurance Company of Baltimore

Food and Nutrition Section

Gordon W. Molyneux, 42 Barker Ave., White Plains, N. Y., Milk Inspector, Westchester County Dept. of Health

J. Y. Phelan, 705-49 Ave., N., Nashville, Tenn., Sanitary Officer

Child Hygiene Section

Youshn S. Blanchard, A.B., 11526 Linwood Ave., Detroit, Mich., Director, Health and Physical Education, City Public Schools

Charles E. Rink, M.D., 27 South 9th St., Indiana, Pa., Medical Inspector, Public Schools

Elma Rood, M.A., State Board of Health, Louisville, Ky., Assistant Director, Public Health Education

Public Health Education Section

John R. Heller, Jr., M.D., State Dept. of Health, Nashville, Tenn., Consultant, Venereal Disease Control

Alexander V. Morgenstern, 415 Central Park West, New York, N. Y. (Assoc.)

Ivan L. Ressler, E. I. duPont de Nemours & Co., Niagara Falls, N. Y., Consultant on Fumigation Problems, R. & H. Chemicals Dept.

Theodore R. Rhea, C.P.H., Dept. of Public Instruction, Honolulu, T. H., Director of Health Education

George Schwartz, M.D., 2487 Davidson Ave., Bronx, N. Y., Chairman, Public Health Committee, Lions Club

Kate H. Trawick, 2501 Ashwood, Nashville, Tenn., Associate in School Health Education, State Dept. of Public Health

Public Health Nursing Section

Grace Beatty, R.N., Greeneville, Tenn., County Nurse

Iter D. Boyette, R.N., P.H.N., 3197 Kinross Ave., Nashville, Tenn., Field Nurse, Davidson County Health Dept.

Dollie Burkitt, 4503 Charollette Ave., Nashville, Tenn., Field Nurse

Helen J. Greer, R.N., Dept. of Public Health, Franklin, Tenn., Supervising Nurse

Barbara L. Klassy, R.N., Franklin, Tenn., Tuberculosis Clinic and Field Service Nurse

Shirley C. Titus, A.M., R.N., School of Nursing, Vanderbilt University, Nashville, Tenn., Dean and Professor of Nursing Education

Estelle West, R.N., 1012 Mayner Ave., Nashville, Tenn., Public Health Nurse

Epidemiology Section

George T. Blydenburgh, M.D., C.P.H., Ohio Wesleyan University, Delaware, O., Director, Student Health

Bruce H. Douglas, M.D., Herman Kiefer Hospital, Detroit, Mich., Tuberculosis Controller, Dept. of Health

Unaffiliated

Ralph P. Bridgman, 60 E. 42 St., New York, N. Y., Director, National Council of Parent Education

Will G. Sheffer, D.D.S., Medico Dental Bldg., San Jose, Calif. (Assoc.)

William F. Stein, M.D., P. O. Box 703, Fresno, Calif., County Health Officer

CLOSING DATE FOR ACCEPTING APPLICATIONS FOR FELLOWSHIP

ACTIVE members who wish to make application for Fellowship in the American Public Health Association, are hereby notified that their applications must be submitted to the Committee on Fellowship and Membership not later than July 1, 1934, if final action is to be taken by the Governing Council at the Pasadena Annual Meeting in September.

For the benefit of the newer members

of the Association, the two prerequisites for applying for Fellowship are repeated here. These are (1) the applicant must have been an active member of the A.P.H.A. for at least 2 years, and (2) he or she must be at least 30 years of age. The professional qualifications which are essential are given in the By-laws, which appear on page 13 in the *Year Book* issued as a supplement to the February *Journal*.

NEWS FROM THE FIELD

ASSOCIATION OF WOMEN IN PUBLIC HEALTH

ADA E. SCHWEITZER, M.D., F.A.P.H.A., Indianapolis, Ind., resigned as President of the Association of Women in Public Health, effective May 1, 1934.

The former Vice-President, Ellen Stadtmuller, M.D., member A.P.H.A., San Francisco, Calif., is now President and will plan the Association program for the convention to be held at Pasadena during the session of the A.P.H.A.

The Secretary is Pauline Brooks, F.A.P.H.A., Williamson, School Health Bureau, Welfare Division, Metropolitan Life Insurance Co., New York, N. Y.

The Treasurer is Alice C. Bagley, member A.P.H.A., Assistant Superintendent of Nursing, Metropolitan Life Insurance Co., San Francisco, Calif.

Mary R. Lakeman, M.D., F.A.P.H.A., Chairman of the Health Knowmeter Co. of the Association of Women in Public Health, announces that this most valuable card index of health information is ready for distribution. Questions concerning con-

tents and cost should be addressed to her at 100 Nashua St., Boston, Mass.

CONFERENCE OF STATE AND PROVINCIAL HEALTH AUTHORITIES AND U.S.P.H.S.

THE U. S. Public Health Service joins the Conference of State and Provincial Health Authorities of North America in extending to you a cordial invitation to attend and take part in the Annual Conference of the two organizations, to be held in the Public Health Service Building, Washington, D. C., June 5-8, 1934.

CALIFORNIA HEALTH DEPARTMENTS MERGE

THE San Leandro Health Department and the Alameda County Health Department, of California, have combined and will function under the direction of Dr. Ira O. Church, Health Officer, of Alameda County, member A.P.H.A. Dr. Luther Michael retired as Health Officer of San Leandro, having held the position many years.

NEW CANCER CLINIC

THE establishment of the Atlanta Cancer Clinic, for pay patients,

has been authorized, with headquarters in the Medical Building of the Georgia Baptist Hospital, Atlanta, Ga. A diagnostic fee commensurate with the patient's circumstances will be charged, the funds to be used for the maintenance of the clinic. The Clinic will have available 370 mg. of radium.

Dr. James L. Campbell has been named Director of the Clinic.

SUMMER CAMP FOR MILWAUKEE GIRLS

PHI Delta Pi, National Professional Physical Education Fraternity for Women, will establish a Camp for Underprivileged Children at Camp Brosius, Elkhart Lake, Wis., in July. The campers are to be 10 and 11 year old girls who live in the congested districts of Milwaukee. They are to be recommended by social agencies to the advisory committee of the Summer Outing Fund.

Martha A. Gable, Director of Physical Education in Junior High Schools in Philadelphia, is to be Camp Director. Miss Hazel C. Orr, Director of Physical Education in Woodward High School of Cincinnati, is Grand President. Phi Delta Pi is a member of the Women's Professional Panhellenic Association.

NEW PSYCHIATRIC CLINIC

THROUGH a recent gift of \$80,000 from the Rockefeller Foundation, the establishment and maintenance of a psychiatric unit at the Massachusetts General Hospital, Boston, Mass., is now in prospect.

Of this sum, \$42,000 will go to Harvard Medical School for psychiatric work and the remainder will be available for the establishment of the clinic, the construction of which will begin in September. Dr. Stanley Cobb, Bullard Professor of Neuropathology at Harvard, will direct the project. Close cooperation will be established with McLean Hospital, of Belmont, Mass.,

which has recently been reorganized, for the treatment of the more difficult cases.

HEBREW UNIVERSITY PLANS CANCER RESEARCH

A TRUST fund of approximately \$200,000 (£39,000) has been created by anonymous donors to be used over a period of 10 years for the establishment and maintenance of a department at the Hebrew University in Jerusalem for research into the causes and cure of cancer.

Part of the available funds will be used for the erection and adequate equipment of special laboratories.

OREGON STATE BOARD OF HEALTH ELECTS OFFICERS of the Oregon State Board of Health recently elected in Portland are:

Dr. Albert Mount, President; Dr. Joseph P. Brennan, Vice-President; and Frederick D. Stricker, F.A.P.H.A., Secretary.

FOR GRADUATE NURSES

FOR nurses interested in studying the behavior of and having practical experience in working with young children, a course is being given at the Child Development Institute of Teachers College, Columbia University, New York, from June 11 to July 6. Intensive experience with well children will be provided under supervision in the nursery school and play group and regular classes and individual conferences will be held to analyze and study the behavior of the children as well as the technics of guidance used in working with them.

DRS. RIDDLE AND MCCOLLUM RECEIVE MEDALS

THE American Institute awarded gold medals to Dr. Oscar Riddle, member A.P.H.A., and Dr. E. V. McCollum, F.A.P.H.A., at a meeting

on May 3 at the American Museum of Natural History, New York, in recognition of their respective achievements in the fields of research on the glands of internal secretion and of nutrition.

DIPHTHERIA IMMUNIZATION IN DALLAS

DUE to the fact that Dallas has been shown to have the highest diphtheria morbidity and mortality of any city in the United States, the Department of School Health Work recently undertook a survey of immunization in the public schools. The survey has been conducted in 46 elementary schools, in which 27,094 children were enrolled.

NEW ARKANSAS STATE BOARD OFFICERS

AT a recent meeting of the Arkansas State Board of Health, Dr. Joseph G. Gladden was named President; Dr. Thomas Wilson, Vice-President; and Dr. William B. Grayson, member A.P.H.A., Secretary.

UNIVERSITY OF MINNESOTA RECEIVES GIFT

THE University of Minnesota recently received a gift of \$500,000 for the advancement of medical research from Dr. William J. Mayo, and Charles H. Mayo, member A.P.H.A., of Rochester, Minn.

PERSONALS

HAVEN EMERSON, M.D., Professor of Public Health Practice at Columbia University College of Physicians and Surgeons, President A.P.H.A., and **DR. FRANK L. BABBOTT, JR.**, President of Long Island Medical College of Brooklyn, N. Y., were appointed members of the Board of Health of New York City by Mayor LaGuardia. Dr. Emerson was Health Commissioner of New

York from 1915 to 1918. Dr. Emerson will make a survey of tuberculosis in the city at the request of the Department of Hospitals.

DR. EDWARD H. SKINNER, member A.P.H.A., has been appointed Chairman of the Public Health and Welfare Committee of the Chamber of Commerce of Kansas City, to succeed Dr. George E. Bellows, who has resigned after 12 years' service.

DR. SAMUEL J. ELLISON, member A.P.H.A., who had been Health Commissioner of Adams County 14 years, is succeeded by Dr. Hazel L. Sproull, of West Union, Ohio.

DR. FRANK R. DEW, member A.P.H.A., of Barnesville, has retired from the office of Health Officer of Belmont County, which he occupied for 11 years.

DR. CHARLES E. THOMPSON, of Mingo, Ohio, has been appointed Health Officer of Champaign County after a lapse of several months in which the county was without a health head because of lack of funds.

DR. FRANCIS M. TEEPLE, of Fremont, Ohio, has been named Health Officer of Sandusky County.

DR. ARNOLD O. ABRAHAM, of McConnelsville, Ohio, succeeds Dr. James B. Naylor as Health Officer of Morgan County.

DR. WILLIAM L. FAUL, of Russellville, succeeds Dr. John G. Anderson, of Fayetteville, as Health Officer of Brown County, Ohio.

DR. FAY E. GAITHER, of Lenora, has been appointed Health Officer of Norton County, Tex.

DR. EBER REEVES has been named Health Officer of Decatur County, Kans.

DR. JOHN I. MITCHELL, of Salem, Ind., has been made Health Officer for Washington County, succeeding the late Samuel A. Roberts.

DR. DARREL L. EVANS has been named Health Officer of Riley County,

Kans., succeeding Dr. John R. Mathews, of Manhattan, who resigned to engage in private practice in Glenwood Springs, Colo., after holding the position since 1923.

DR. BASIL B. BRIM has been named Health Commissioner of Toledo, Ohio, now a part-time office.

JOHN L. JONES, M.D., of Louisville, Ky., was appointed recently Assistant Utah Health Commissioner and State Epidemiologist. He assumed his new duties in his native state on April 20 for the first time. The post of epidemiologist has been vacant since 1929 due to lack of funds. The added expense will be shared by the state and the International Health Division of the Rockefeller Foundation.

DEATH

HARRY L. ABRAMSON, M.D., member A.P.H.A., and Director of the Bureau of Laboratories of the New Brunswick Department of Health at Saint John, N. B., since 1918, died in New York on April 17. Dr. Abramson, whose home was in St. Joseph, Mo., was associated with Dr. William H. Park in the Research Laboratories of the City of New York before he joined the New Brunswick Department of Health.

CONFERENCES

June 1-2, Annual Conference, New England Health Education Association, Massachusetts Institute of Technology, Cambridge, Mass.

June 5-6, 7th Annual Meeting, Arizona Public Health Association, Prescott, Ariz.

June 4-8, Annual Convention of the American Water Works Association, Hotel Commodore, New York, N. Y.

June 5-8, Annual Conference of U. S. Public Health Service and Con-

ference of State and Provincial Health Authorities of North America, Public Health Service Building, Washington, D. C.

June 11-13, Twenty-third Annual Meeting of the Canadian Public Health Association, Montreal, Que., Canada.

June 13-16, 13th Annual Convention of the American Physiotherapy Association, Cleveland, Ohio.

June 14-15, Annual Convention, Central Atlantic States Association of Dairy, Food and Drug Officials, Baltimore.

June 18-23, Summer Meeting of the Council of the American Association for the Advancement of Science and Associated Societies, Berkeley, Calif.

June 25-29, 7th Annual Meeting of the American Home Economics Association, New York, N. Y.

June 26-28, Annual Conference of Health Officers and Public Health Nurses, Saratoga Springs, N. Y.

June 26-28, American Association of School Physicians, Saratoga Springs, N. Y.

June 27-29, 8th Annual Conference of the Pennsylvania Sewage Works Association, State College, Pa.

July 9-14, Health Congress, to be held under auspices of the Royal Sanitary Institute, Bristol, England

Aug. 6-10, Annual Meeting of the American Dental Association, St. Paul, Minn.

Sept. 3-6, 63rd Annual Meeting, American Public Health Association, Pasadena, Calif.; headquarters, Huntington Hotel and Maryland Hotel.

Sept. 4-6, 9th Conference of the International Union Against Tuberculosis, Warsaw, Poland.

Oct. 15-18, 17th Annual Meeting of the American Dietetic Association, Washington, D. C.

Nov. 13-16, Southern Medical Association, San Antonio, Tex.

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Industrial Intoxication Following Skin Sorption^{*}

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THE Nineteenth Session of the Industrial Hygiene Section opened as part of the Sixty-second Annual Meeting of the American Public Health Association.

By custom, if not by constitutional requirement, the Chairman is obligated to present some introductory considerations pertinent to the affairs of the section. In the past, the greater number of chairmen have elected to estimate existing conditions, and to indicate desirable trends for the future. In the present instance, we appear to be at a junction point—between a past period filled with ills well known to everyone, and the beginning of new departures into which we have not progressed sufficiently to permit of estimation of their values to industrial hygiene.

On this account, the present Chairman sounds no keynote, and instead desires to make general rather than technical comment on a phase of industrial hygiene that may be much

neglected, *i.e.*, toxicity following the entry of various substances through the skin.

The mechanisms by which many substances accomplish passage through the skin are little known. On an empiric basis, it has become established that numerous medicaments and intoxicants penetrate the skin; and, conversely, that others are barred. With the possible exception of fat-dissolving agents, the entering substances are often so dissimilar as to stultify any belief in the commonness of properties permitting absorption.

The singular status of skin permeability is reflected in a number of contrasting examples. Boric acid solutions, applied to the healthy skin, appear in one minute in the urine; but citric acid of equal strength, similarly applied, is said to be wholly unabsorbed. Moreover, borates, with a physiologic action closely resembling boric acid, do not enter the skin when placed in contact.¹ Hydrocyanic acid gas readily passes through the skin, and may produce poisoning after this form of entry, but carbon monoxide gas does not so enter, or at best only in traces. Tetraethyl lead penetrates the unbroken skin,

^{*} Read before the Industrial Hygiene Section of the American Public Health Association at the Sixty-second Annual Meeting in Indianapolis, Ind., October 9, 1933.

but solutions of inorganic lead compounds are not known to pass this portal in quantities susceptible to measurement. Substances closely related chemically are likely to present the widest differences in ability to enter the body through the intact skin.

The entire present situation is such that only by trial may the fate of any agent with an unknown status as to skin absorbability be determined. Thirty-five years ago Schafer² wrote:

To decide the case for or against the possibility of absorption by the human skin, would appear a simple problem, yet a literature reaching back over a century indicates that the production of unimpeachable testimony on either side has proved a matter of no little difficulty. . . .

That statement is equally true today!

Not until 1932 was it established, on a quantitative basis, that iodine—one of the commonest medicaments—applied to the skin is absorbable. Nyiri and Jannitti,³ after referring to the evenly matched controversy for the past 65 years as to the skin absorption of iodine, established that iodine and iodides penetrate the unbroken skin; that 12 per cent only of the amount painted onto the skin is at the disposal of the skin; that 4 per cent is the maximum taken up by the skin in the first few hours after application; and finally that at the end of 3 days (after application) up to 5 per cent of the total iodine is still within the skin; 7 to 9 per cent having entered the body through the blood or lymph. This precise sort of information is widely lacking, especially for industrial intoxicants, which agents are most likely to lead to damage, because of the extent of exposure.

Industrial hygiene long has emphasized the respiratory tract as the chief portal of entry of industrial intoxicants. By contrast, the skin, as a portal of entry, has been relegated to an insignificant position. Masks, respirators,

helmets, etc., have been provided helpfully to protect the respiratory tract against invasion, without a thought for the skin. Development of intoxications among workers well guarded against inhalation of toxic vapors, gases, etc., is increasing the consideration extended to skin absorption as a factor in the causation of occupational diseases, chemical accidents, etc. Practical hazards are being proved to exist.

FACTORS INFLUENCING SKIN SORPTION

1. Sustained, profuse sweating eventuating in an alkaline perspiration, may deprive the skin of its oily protection, and facilitate skin absorption.
2. Circumstances leading to an hyperemia of the skin promote skin absorption.
3. Breaks in the integument, such as from a dermatitis or trauma, favor entry into the body. Such entry may not, however, constitute true skin sorption.
4. Fat-dissolving agents, such as naphtha, may themselves enter the body or create opportunity for other substances to find entry through the skin.
5. Friction applied to the skin, such as the inunction of mercury ointments is conducive to skin absorption.
6. Failure to free the body of contact with materials that may enter the skin is related to the practical dangers of skin absorption of industrial intoxicants.
7. Naturally, oily skin offers additional difficulties to the entry of some substances.
8. The younger the skin, the greater the probability of skin sorption by that particular skin, up to the years of senility, and in the absence of skin injury.
9. Cataphoresis may thrust into the skin substances not otherwise absorbable.

THE MECHANISMS OF SKIN SORPTION

It is most unlikely that any one physical principle governs the passage of chemicals through the skin. Boric acid undoubtedly enters through osmosis; adsorption may play a significant rôle in connection with hydrocyanic acid. Undoubtedly, certain substances find entry by way of the sebaceous glands, and only so. Rubbing may lead to mechanical deposition within the hair follicles and glandular spaces.

Surface tension, plasmolysis, diffusion streams, molecular size, and capillarity, all contribute some influence upon the physics of skin penetration. Withal, it is most difficult to determine the demarcation point between normal skin and damaged skin, in relation to these several physical activities. Manifestly, a chemical dermatitis is preceded by some such physical injury to the cells as may be accomplished by plasmolysis.

Reduced to its simplest basis, it appears probable that the characteristic shared by all substances that penetrate the normal skin (in the absence of friction, cataphoresis, etc.) is the capacity for "cell wetting."

This activity of cell wetting is far more complex than is implied in the simple example of water being barred from the skin by the oily film there present, and the function of soap in breaking down this interposed incompatible layer. The behavior of mercury when in contact with metallic lead, furnishes a more acceptable concept of "surface wetting."

If metallic mercury be placed in contact with a piece of lead, the mercury enters and diffuses in all directions. In time the lead becomes crumbly, or at least brittle. It might be assumed that compounds are formed between the lead and the mercury—but such is not the case. Appropriate electrical tests reveal that the lead is unchanged. What has happened is that the mercury, having the peculiar property of "wetting the crystals" of lead, has seeped in between all the faces of the crystals, and in time has made the lead mass crumbly, by depriving the lead of its inter-crystal cohesion. This relationship between lead and mercury is not equally true for mercury and iron, or mercury and cadmium. In the former, the mercury does not permeate the iron (that is, does not wet the crystals); in the latter permeation does occur, but with combinations between the cadmium and the mercury.

If this concept of "crystal wetting" be transferred to "cell wetting," it becomes possible to understand how some substances pass between successive layers of epidermal cells until brought in contact with those deeper skin layers richly supplied with blood and lymph vessels. In the corium sorption is readily accomplished.

SKIN ABSORBABLE SUBSTANCES

In furnishing a list of substances (not all of which have industrial uses) believed to pass the skin barrier, no intent exists to imply that the list is complete, that practical hazards regularly are involved, or that proof of skin sorption for every item on the list is incontrovertibly established.

Ammoniated mercury	Iodides
Anilin oil	Iodine
Belladonna	Kerosene
Benzene	Lanolin
Benzine	Lard
Bismuth	Mercury
Boric acid	Mononitrochlorbenzene
Camphor	Naphtha
Carbon bisulphide	Nicotine
Carbon tetrachloride	Nitranilin
Chlorine	Nitrobenzol
Chloroform	Nitronaphthalene
Creosote	Oleates
Cresols	Olive oil
Croton oil	Osmium
Cyanides	Oxides of mercury
Cyanogen compounds	Paranitranilin
Dimethylanilin	Phosphorus
Dimethyl sulphate	Phenacetin
Dyes (some)	Phenol
Ether	Picric acid
Ethylene chlorhydrin	Pilocarpin
Ethylene dichloride	Quinine
Formaldehyde	Salicylic acid
Formalin	Stoddard's solvent
Garlic	Tetraethyl lead
Gasoline	Toluene
Guaiacol	Trichlorethylene
Hydrocyanic acid	Turpentine
Hydrogen sulphide	Vaseline
Ichthyol	Zylene

PRACTICAL HAZARDS

The usual workman, exposed to an industrial intoxicant that may enter the skin, is likely to be inhaling the vapor,

gas, or fume, at the same time. Occasionally workers who are adequately masked for protection against dangerous substances, still may become intoxicated. Notably this is true in the case of workers about hydrocyanic fumigation of buildings or ships.⁴ Despite protection for the respiratory tract, skin absorption is likely to lead to practical damage from the following substances:

Nitrobenzol, and some of its closely related compounds

Anilin oil, and some of its closely related derivatives and compounds

Hydrocyanic acid, possibly including all cyanogen compounds

Phenol and cresol, including some related coal tar derivatives and compounds, such as picric acid

Tetraethyl lead

SUMMARY

It is the purpose of this presentation to maintain that no adequate body of information is now available as to the mechanisms of skin absorption, or the extent of practical dangers attending industrial skin exposure. If this stand be the correct one, it follows that this field provides opportunity for constructive inquiry.

REFERENCES

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2. Schaefer, E. A. Absorption by the skin. From *Textbook of Physiology*, V, 1:685. Macmillan, 1898.
3. Nyiri, William, and Jannitti, Marie. About the fate of free iodine upon application to the unbroken animal skin. An experimental study. *J. Pharmacol. & Exper. Therap.* XLV:85, 1932.
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Psittacosis Outbreak in Pittsburgh

IN a total of 37 cases of illness among the employees a definite diagnosis of psittacosis was made in 10, and of suspected psittacosis in 27. Of the 10 definitely diagnosed as psittacosis, 4 died, autopsies on 3 of whom revealed the findings seen in psittacosis. Of the 27 suspected cases, 8 were diagnosed pneumonia, of whom 7 died, and 19 as suspected psittacosis only, of which number 2 died. Among the total of 37 cases there occurred 13 deaths, a mortality rate of 35.1 per cent. This rather high mortality rate suggests either an extremely virulent outbreak or that cases of the disease had been missed. From the procedures carried out by the health department it is believed that but few cases were missed, as each employee absent from work for 48 hours was seen by a medical inspector.

With a history of contact with sick birds of the psittacine family, with 10 other employees having illnesses definitely diagnosed as psittacosis, with a death rate of 33.3 per cent, and with

a death rate of 87.5 per cent of those diagnosed as pneumonia, there is little doubt that the 27 cases of suspected psittacosis were actually cases of psittacosis.

These 37 cases of illness developed among approximately 500 employees of a department store and occurred not only among those employed on the floor on which the birds were kept but among those from other floors. Employees from other floors of the store visited the birds, and these employees came in more or less direct contact with them.

SUMMARY

During the past 4 years, 2 rather extensive outbreaks of psittacosis have occurred among employees of department stores in which pet shops were maintained. The first resulted from infected birds which had been imported into the country, and the second from birds raised at an aviary in California. —Extract from L. F. Badger, *Pub. Health Rep.*, May 11, 1934, p. 584.

Pollution Indices of Natural Bathing Places*

W. L. MALLMANN, PH.D., AND ADOLPH SYPIEN
Michigan Engineering Experiment Station, Michigan State College,
East Lansing, Mich.

ALTHOUGH indices of pollution have been established from time to time for bathing pools, few attempts have been made to set standards for natural bathing places. California¹ has proposed a standard of 10 *Escherichia coli* per c.c. and the New York City Department of Health¹ allows 30 *Esch. coli* per c.c. Winslow and Moxon² in a study of New Haven bathing beaches believe that an average of 1 colon bacillus per c.c. with a maximum of not over 10 would be a more reasonable standard as based upon conditions that obtained in their studies. Scott³ in a study of Connecticut's shore waters on Long Island Sound classified bathing waters into 5 classes according to the colon indices obtained:

Average of <i>Esch. coli</i> per 100 c.c.	
Class A+	0 to 10
Class A—	11 to 50
" B	51 to 500
" C	501 to 1,000
" D	over 1,000

In correlating the bacteriological findings with a sanitary survey, the classification in representing bathing beach qualities is as follows:

	Condition
Class A+	good
" A—	good
" B	fair to doubtful

Class C
" D

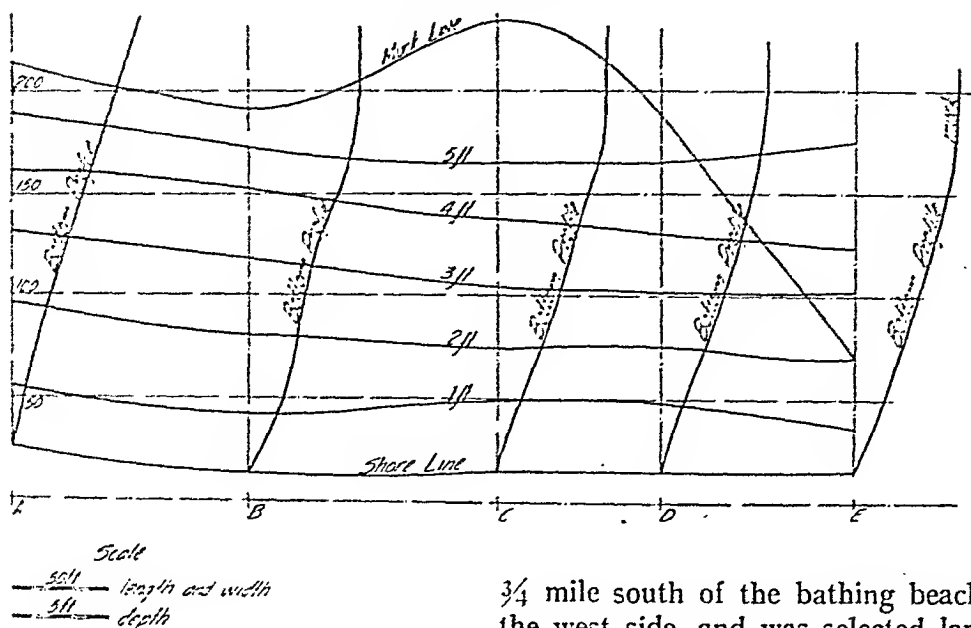
Condition
doubtful to poor
very poor

All of these studies were planned primarily to measure sewage pollution of bathing beaches and not the conditions that would occur in clean waters when large numbers of bathers were present. Scott³ states that only a slight increase in bacterial numbers occurred on an ocean beach during periods of heavy bathing loads. He believes that the number of bacteria introduced by the bathers would not seriously affect his classification. In a survey of the coast line of lower Michigan, the Michigan Stream Control Commission⁴ found results similar to those obtained by Scott in salt water beaches. Colon indices on Lake Michigan beaches that were a considerable distance from sources of sewage pollution frequently were from 0 to 100 per c.c. of water. Such areas undoubtedly represent ideal bathing places.

The conditions that occur, however, on the Great Lakes and ocean beaches are quite different from those occurring on small inland lakes. These lakes, because they frequently do not receive any raw sewage, have been assumed to be safe for bathing. This is largely true, but to date no recognition has been given to the pollution introduced by the bathers. As these lakes are frequently located near large cities, they

* Read before the Laboratory Section of the American Public Health Association at the Sixty-second Annual Meeting in Indianapolis, Ind., October 12, 1933.

FIGURE I—Map of Lake Lansing showing location of bathing beach and sampling points



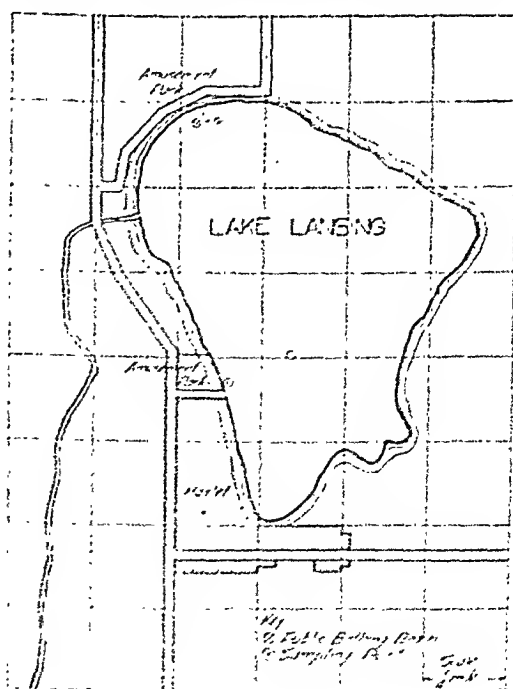
have become very popular. In lower Michigan these lakes are generally small and bathing areas, open to the public, are frequently limited in size. Beaches from 200 to 400 ft. in length are very common. Near the large cities such beaches become very congested on the warm days of August and July.

As no attempt has been made to study the bacteriology of such beaches, the work here presented was done.

A lake near East Lansing was selected due to its convenience, its freedom from sewage pollution, and the presence of a limited size bathing beach that has a heavy patronage. The beach is, in most respects, typical of most inland lakes in the lower part of Michigan. In Figure I is presented a map to show points of sampling, location of the bathing beach, and size of lake, which is approximately $1\frac{1}{4}$ miles long by 1 mile wide at the widest point. The only bathing beach is at the northern end. The control point for collecting samples as checks on the bathing beach, is at an amusement park:

$\frac{3}{4}$ mile south of the bathing beach on the west side, and was selected largely because of its convenience. No sewage enters the lake. It is very active biologically. Samples taken at any point show large numbers of plankton. Rotifers and water fleas are very common. In Figure II is presented a map of the beach, showing its size and

FIGURE II—Profile map of the bathing beach



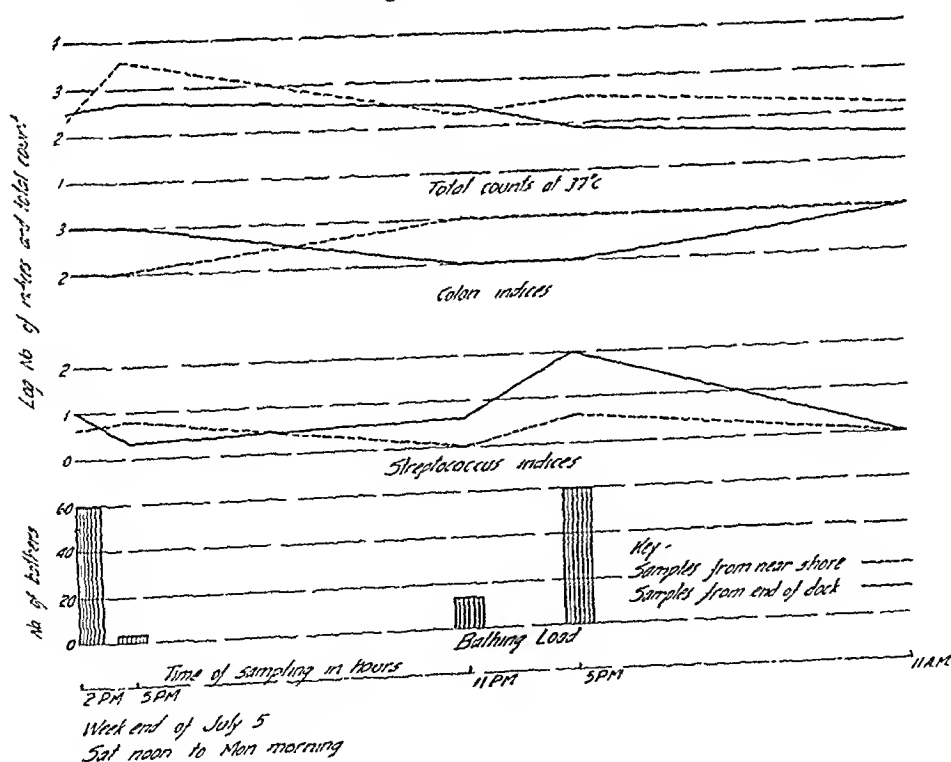
depth. It will be noted that it is sharply circumscribed by an area of soft muck, so the bathers always remain in the sandy area, about 350 ft. long, 200 ft. wide, and approximately 5 ft. deep at the deepest point. The bottom slopes very gradually. The heaviest bathing load is found at B. A bathing dock with diving platform is located here. Most of the bathers enter the water from this dock and generally stay in the close vicinity of it.

It was desired to obtain data on the bathing beach under all conditions such as light and heavy bathing loads, various temperatures, and rest periods. Samples were usually collected at frequent intervals during week-ends; in periods of use and of rest. In most cases samples were obtained early in the morning before bathers arrived, following a day of heavy loads. It was found most satisfactory and most convenient

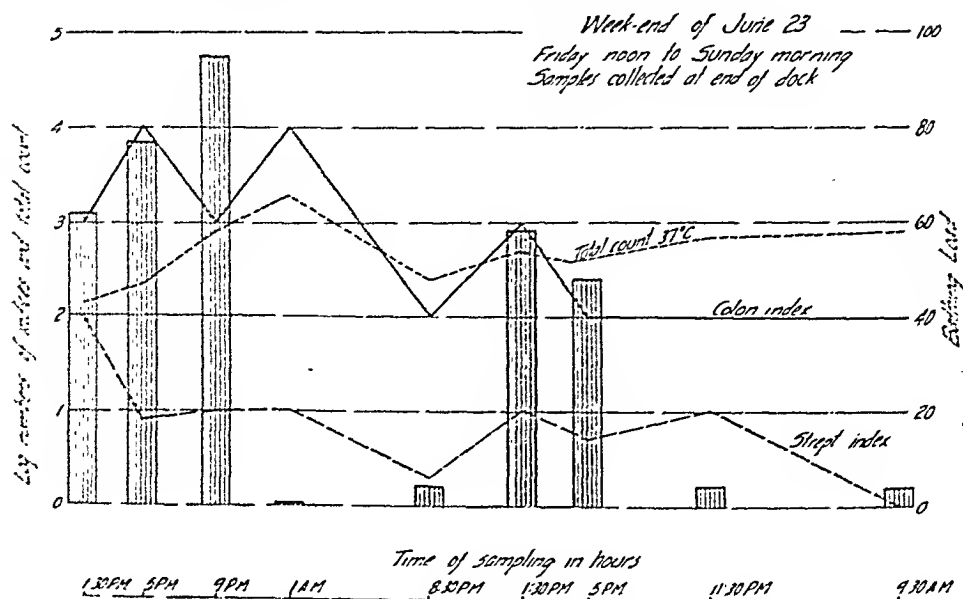
to collect two samples, one at the end of the bathing dock and the other from the dock near the shore in approximately 18 in. of water. Occasionally sand samples were taken at the latter point, particularly in the morning, to determine the influence of sedimentation on the disappearance of the bacteria over night.

The samples were collected in the usual large mouth glass stoppered water sample bottles. Immediately after collection, the following bacteriological examinations were made: Appropriate dilution plates were made using standard plain nutrient agar, and incubated at 25 and 37° C. Bacteriological counts were made after 24 hours' incubation at 37° C. and 48 hours' at room temperature, respectively. Appropriate dilutions of the water were made into standard lactose nutrient broth in Durham fermentation tubes. Generally, the series was 1 to 100,000,

GRAPH I—Comparative data on pollution indices of samples taken from the end of the bathing dock and near the shore



GRAPH II—Comparative data on pollution indices from samples collected at the bathing beach during the week-end of June 23



1 to 10,000, 1 to 1,000, 1 to 100, 1 to 10, 1 c.c., and 10 c.c. direct. Observations were made at the end of 24 and 48 hours' incubation. Tubes showing gas from the least amounts of water were smeared on eosin-methylene blue agar for confirmation of the colon bacillus. All questionable cases were further checked by refermentation in lactose nutrient broth fermentation tubes. After 72 hours' incubation, 48 hours' at 37° C., followed by 24 hours' at room temperature, all tubes were examined for streptococcus microscopically by the method recommended by Mallmann and Gelpi.⁵ Indices for both the colon bacillus and streptococcus are based on 100 c.c. volumes of water and were determined by the procedure recommended by *Standard Methods of Water Analysis*.⁶

At first, samples were taken at three points on the bathing beach to assure obtaining average results, but this was soon found impractical due to inability to handle the large number collected. After careful examination of the data so obtained and a study of the beach itself, it was decided to sample at only one point—that of greatest pollution as

evidenced by the density of bathers. This was a bathing dock located at one side of the beach.

The results for this week-end are representative of all the data, and show the relationship between samples from the end of the dock and those from near shore. It will be observed that the colon indices and the total count are somewhat parallel. In general, the colon indices and total count were slightly higher near shore. On the contrary, the streptococcus indices were generally higher at the end of the dock. The latter was to be expected as the total immersion of the body is more frequent in the deeper water. Because the samples from the end of the dock gave results on total count and colon indices comparable to the samples from near shore and higher streptococcus indices, only samples from the end of the dock will be considered.

As the week-end bathing loads were always much higher than those obtained during the week, these periods were selected for more intensive study. Each week-end the sampling was started on either Friday or Saturday afternoon and continued until Monday

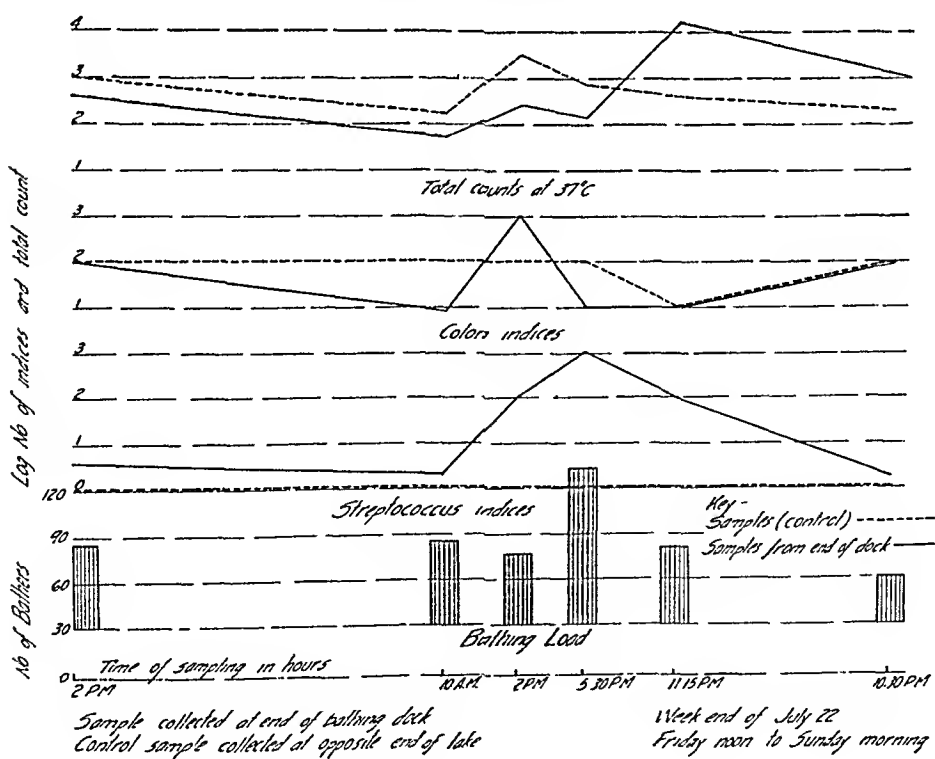
morning, depending upon weather conditions. Samples were taken late at night after bathing had ceased and early in the morning before bathing started. In this manner the fall and rise in the pollution could be observed. In Graph II are presented the results of a typical week-end test. It will be observed that, in general, all three indices of pollution parallel roughly the bathing load, although the streptococcus index parallels it more closely; also that the number of colon bacilli and the total counts are considerably higher than the number of streptococci. This is just the opposite of the condition in a chlorinated swimming pool where the chlorine destroys the more susceptible colon bacilli and leaves only the streptococci. The total count in a chlorinated pool may also be lower due likely to the fact that the streptococci do not appear on the agar plate.

It might be argued that all three in-

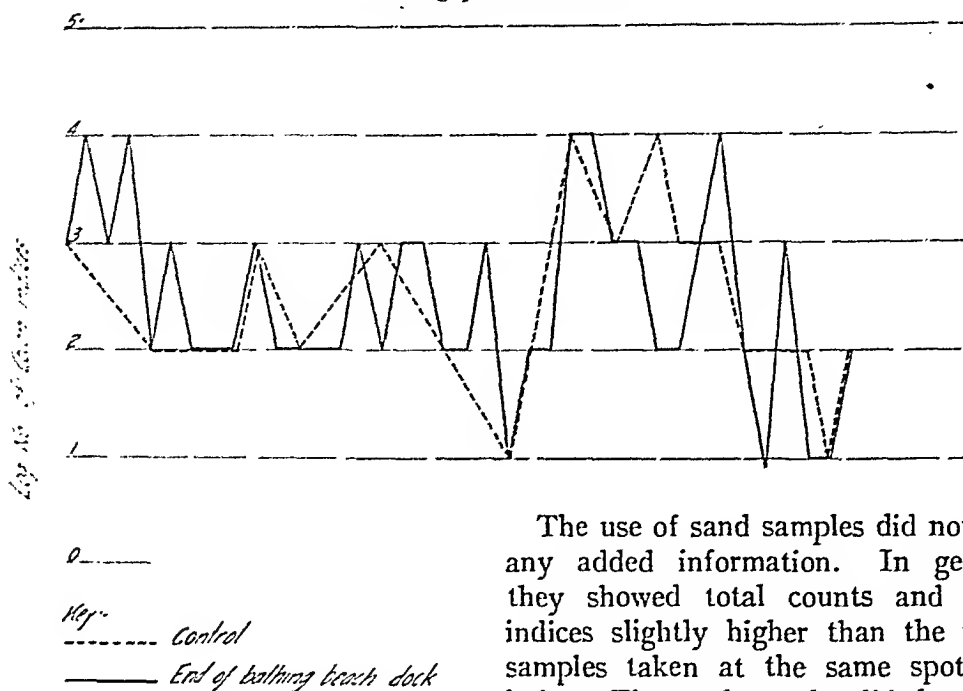
dices of pollution were equally good, though, if the control samples, taken a safe distance from the beach, are compared with the samples taken at the time of heavy bathing loads, another picture is presented, as in Graph III. It will be observed that the total counts of the bathing beach and the control area are roughly parallel, as also are the colon indices. Both of these indices show a diurnal rise, which may be due to the rise in temperature. In the case of the streptococcus index, no streptococci were observed in any dilution of the samples tested in the control samples. On days when no bathing occurred, streptococci were absent. Generally in the sample collected in the morning, even following days of heavy loads, the streptococcus incidence was low or negative.

The results presented in Graph III concerning the parallelism between the colon indices on the bathing beach and

GRAPH III—A comparison of pollution indices from samples collected on the bathing beach and a control point free from pollution during the week-end of July 22



GRAPH IV—Comparative data of colon indices from the bathing beach and control area during period of study



on the control area are more strikingly presented in Graph IV where the colon indices for the period of study are presented. The averages for these areas were practically the same.

Graph V shows the results of tests on total count for the bathing beach and the control area. The total counts for the bathing beach are, on the average, considerably higher than the control area; however, there is considerable overlapping of the counts. In Graph VI are presented the data on streptococcus indices for both the bathing beach and the control area. Here the indices for the control area are zero throughout, while a very marked fluctuation occurs in the bathing beach samples.

Graphs IV, V, VI also show the importance of repeated sampling before passing judgment upon natural bathing areas using any bacteriological index. It will be observed that catch samples taken on most any day or night might show either acceptable or unacceptable conditions when based on any of the three pollution indices presented.

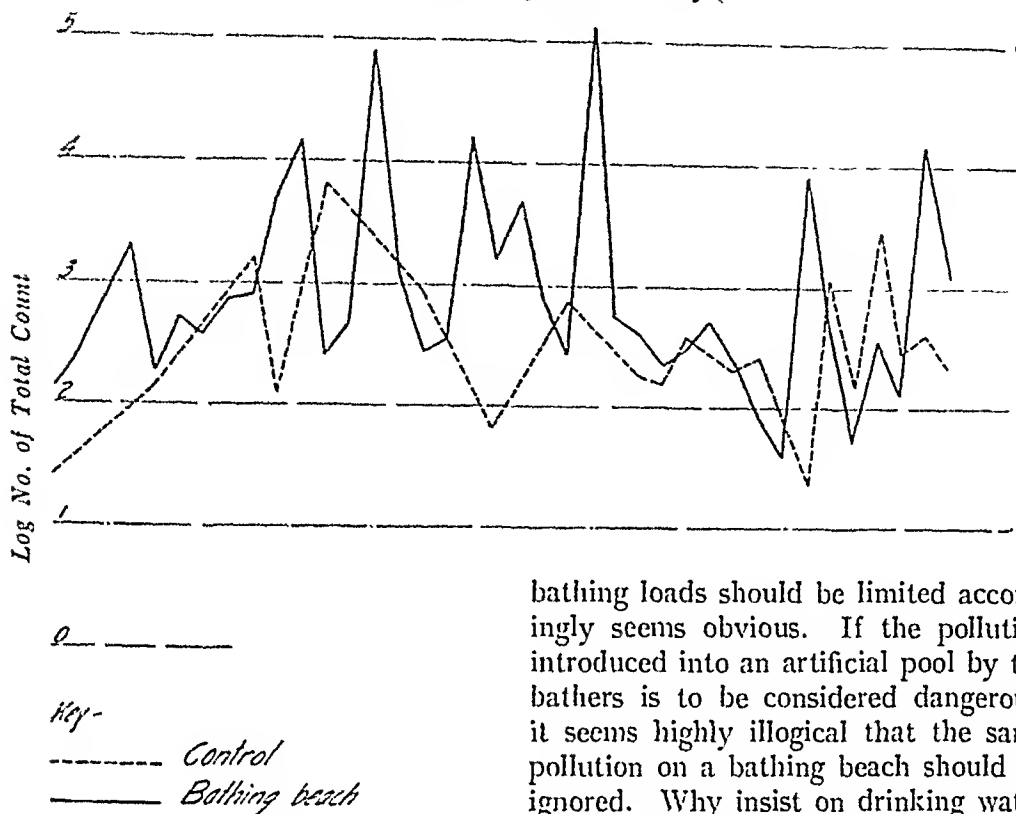
The use of sand samples did not give any added information. In general, they showed total counts and colon indices slightly higher than the water samples taken at the same spot just before. The sand samples did show that sedimentation did not account for the appearance of the streptococci overnight, as the morning sand samples were negative to tests for these organisms.

The samples taken in the center of the lake always showed lower counts than those collected near shore at the same time. The results of these tests did not give any additional information; hence the data are not presented.

On ocean and large lake beaches it is conceivable, and very probable, that currents due to wind and tides cause such changes in water that dilution removes the bacteria introduced by the bathers. Further, the large size of such beaches and the corresponding volume of water in the bathing area give such great dilution that no appreciable increase in the numbers of bacteria would be expected. However, in the light of the data here presented, the writers feel that samples collected during heavy bathing loads might show results similar to those found on the beach discussed.

Contrary to accepted opinion, the writers believe that momentarily a natural bathing beach is not different

GRAPH V—Comparative data on total counts from the bathing beach and control area during the period of study



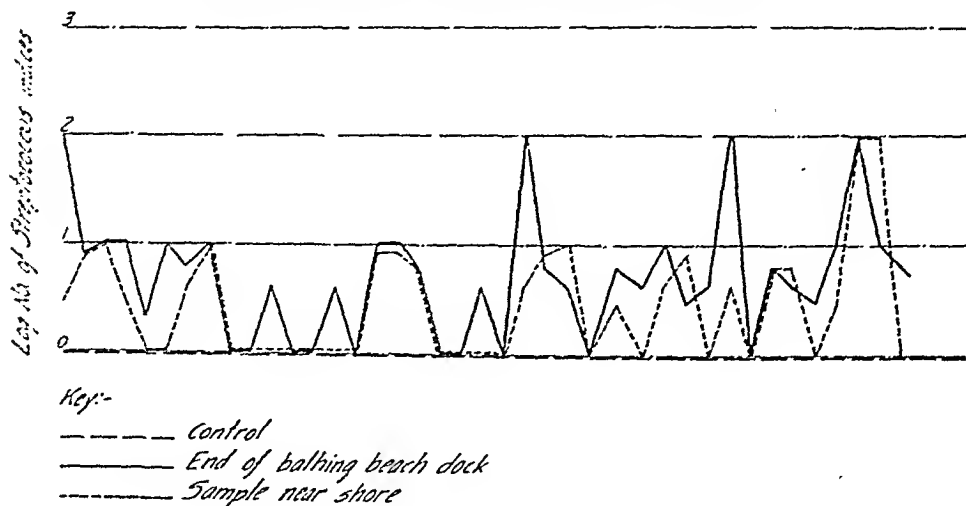
from a circumscribed indoor or outdoor bathing pool. This is particularly true of the type of beach used in this study. This beach, due to the muck areas that bound it, is very closely demarcated. Very few bathers venture beyond the 200 ft. limit due to the weeds and muck that begin there. These natural barriers delimit the beach as effectively as a wall. As Mallmann and Cary⁷ found that in a sterile chlorinated pool the bacterial counts rose rapidly after the introduction of heavy loads, it is quite conceivable that changes of water on the beach are so slow that during periods of heavy loads this factor can be ignored as a means of purification. That this is true is borne out by the data which show that the streptococcus indices rise with the bathing load and disappear gradually after discontinuance of bathing. It would seem logical to treat such beaches in a manner similar to unchlorinated indoor pools. That the

bathing loads should be limited accordingly seems obvious. If the pollution introduced into an artificial pool by the bathers is to be considered dangerous, it seems highly illogical that the same pollution on a bathing beach should be ignored. Why insist on drinking water standards for an artificial pool and have extremely liberal or no standards for the natural beach?

It is true that the number of *Escherichia coli* in the swimming pool and in the waters of natural beaches are not comparable; however, the data in this paper, and in earlier ones by the senior author, have demonstrated that the streptococci do measure the pollution introduced by the bather. Although no standards for streptococcus incidence are offered, it is possible to devise a standard for this organism that can be applied equally well to either artificial or natural bathing places. To arrive at a standard it will be necessary to collect a large volume of data by workers in various parts of the country under various conditions. It is hoped by the writers that the committee on swimming pools and bathing places will undertake such a project.

That the *Esch. coli* test, which serves as the best index of the sanitary

GRAPH VI—Comparative data on the streptococcus indices from the bathing beach and the control area during the period of study



purity of a water supply, is not necessarily infallible as an indicator of unsanitary conditions is again emphasized by the writers. The senior author has demonstrated that *Esch. coli* is not the best indicator of swimming pool pollution, and again in this paper it has been demonstrated that this organism does not measure the pollution introduced by the bather in sewage-free bathing beaches. It must be remembered that in a water containing large amounts of organic matter *Esch. coli* grows abundantly even in the absence of sewage or bathing pollution and thus ceases to be an indicator of pollution. The same holds true of the 37° C. total count.

SUMMARY

The most representative samples of the bathing beach water were obtained in 5 ft. of water as compared to samples taken near the shore. This was particularly true of the streptococcus indices.

The colon indices and the 37° C. total count did not always respond to changes in bathing loads. These indices obtained on the bathing beach were not markedly different from indices obtained at points free from pollution at the same time.

The streptococcus index fluctuated

with the bathing load. Streptococci were not found at points free from bathing pollution.

The streptococci disappeared over night. The colon and total counts indices sometimes showed an increase over night, although they were generally lower.

Catch samples in no instance should be used as a measurement of the sanitary condition of a bathing beach.

The need of controlled bathing loads on limited inland lake beaches appears essential. Conditions on the limited bathing beach presented were similar to those obtained in indoor and outdoor swimming pools.

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The Effectiveness of Vaccines Used for the Prevention of Typhoid Fever in the United States Army and Navy

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THE practical results obtained with specific typhoid prophylaxis indicate that, while this procedure does not confer an absolute immunity, it has been of great value in reducing the incidence of typhoid fever among troops, even when living under insanitary conditions. However, because of the lack of a suitable laboratory test of vaccine potency, there has been some uncertainty as to the exact degree of protection afforded by vaccination, and considerable speculation as to the relative merits of different typhoid vaccines.

With the development of newer concepts of the various antigenic changes which may accompany visible dissociative alterations in bacterial cultures, attempts have been made to utilize such information in establishing exact criteria for the selection of cultures most suitable for use in typhoid vaccines. Theories recently evolved from studies of bacterial variation have led certain individuals to question the value of vaccines prepared with sub-strains of the well known Rawlins culture of typhoid bacillus, on the assumption that during their long period of cultivation on artificial media these cultures may have lost

certain characteristics necessary to an effective immunizing agent. These theoretical objections to the Rawlins strain have been based largely on cultural and immunological reactions observed in the laboratory, and there has been considerable disagreement as to their validity.

Since a sub-strain of the Rawlins culture has been employed in all typhoid vaccines prepared at the Army Medical School and used by both the Army and Navy, those responsible for the manufacture of these vaccines have naturally been interested in determining whether this culture is still suitable for vaccine production. In searching for the answer to this important problem it must be borne in mind that while theoretical considerations based on antigen-antibody reactions may be suggestive, the only known measure of the protective action of a typhoid vaccine is the incidence of typhoid fever among large groups of vaccinated individuals.

It is the purpose of this paper briefly to review the history of typhoid vaccination; to recount the experience with the U. S. Army sub-strain of the Rawlins culture; to discuss various fac-

tors, including dissociation, which might have influenced the protective action of the vaccines; to correlate these factors with the incidence of typhoid fever; and to determine, if possible, to what degree the vaccines now in use conform to the requirements of a satisfactory prophylactic agent.

EARLY HISTORY OF TYPHOID VACCINATION

The possibility of artificially immunizing human beings by the inoculation of typhoid bacilli was naturally suggested at an early date by the successful use of vaccines for the prevention of certain other diseases, and by the observation that one attack of typhoid fever usually protects against subsequent infection.

During the latter part of the 19th century many investigators attempted to test this possibility by vaccination experiments with laboratory animals, including guinea pigs, rabbits, and mice. Chantemesse and Vidal¹ (1888) and subsequent workers showed that such small animals, which could be killed in a short time by the inoculation of large numbers of living typhoid bacilli, might also be protected against the fatal toxic reactions by the preliminary injection of killed typhoid cultures. Because of the natural resistance of these animals to spontaneous typhoid infection, and their failure to develop a disease resembling typhoid fever, such experimental results were not considered as directly applicable to the problem of typhoid prophylaxis in man. However, discovery of the fact that the vaccination of animals produced specific antibodies, including agglutinins, bactericidal bodies, and bacteriolysins, similar to those found in the blood of typhoid convalescents, led to the hope that the presence of these antibodies might furnish a reliable index of immunity. Such observations, and the work of Haffkine on cholera im-

munization, stimulated interest in the possibility of protecting man against typhoid fever by the use of vaccines.

During 1896 Pfeiffer and Kolle,² in Germany, and Wright,³ in England, inoculated suspensions of killed typhoid bacilli into human beings, observing that this procedure was safe and that it was followed by an increase in antibodies in the blood of such individuals. In 1897, Wright⁴ suggested the use of typhoid vaccines in armies and hospitals; and started his pioneer work which constitutes the real beginning of specific typhoid prophylaxis. During the next few years he and Semple⁵ prepared vaccines from killed broth cultures of typhoid bacilli, with which they inoculated several thousand British soldiers in India and a number of persons in England. During the Boer War he and Leishman furnished 400,000 doses of vaccine for voluntary use among the English troops; and it is estimated that about 100,000 men were inoculated. While the vaccination records for the Boer War were incomplete, Wright⁶ concluded that among those inoculated the incidence was diminished about 50 per cent and the mortality even more. However, for the entire Army with a total strength of 380,605 the typhoid incidence rate was 151.56 per 1,000 and the mortality was 21.08 per 1,000. Such appalling rates created a very unfavorable impression, and there were many reports claiming that the vaccine not only failed to protect but had actually increased the number of cases and deaths. Consequently, toward the end of the War, typhoid inoculation was stopped in the British Army and a commission was appointed to re-investigate the subject.

As a result of their statistical studies this commission,⁷ in 1904, made an interim report in which it was recommended that inoculation be resumed as a voluntary measure in the British

Army; and that experimental work be undertaken with a view to increasing the effectiveness of antityphoid vaccination. The investigations, which were continued for several years by Leishman and his associates, produced valuable information, and led Leishman⁸ in 1910 to conclude that, while various factors might have played a part, the disappointing results of vaccination during the Boer War were almost entirely due to irregularities in the preparation and standardization of the vaccines. Consequently the older methods were modified in a number of ways including: (a) the selection of a more suitable strain of typhoid bacillus, (b) the use of cultures grown in nutrient broth for 48 hours instead of 10 to 16 days, (c) reduction of the killing point from 60–65° C. to a maximum of 53° C., (d) cooling of the heated suspension before the addition of 0.4 per cent lysol, (e) standardization of the vaccine by Harrison's modification of Wright's counting method, (f) reduction of the dose to $\frac{1}{2}$ and 1 c.c. amounts, of a 1 billion per c.c. suspension, and (g) adoption of an expiration date of 3 months.

ORIGINAL SELECTION OF THE RAWLINS STRAIN OF *E. TYPHI*

In view of the present question as to the relative immunizing value of different strains of typhoid bacilli, it is of interest to note that this problem was given serious consideration in 1904 by the British commission.⁷ In their effort to produce the most satisfactory vaccine possible, for military use—that is, one combining maximum protective action with sufficiently low toxicity—they investigated various strains of *E. typhi*, including old cultures, and others which had recently been isolated from cases of typhoid fever. It was observed that “all strains did not behave alike when grown under identical conditions,” and the conclusion was

reached that “it was not clear upon what this variability depended as no constant factor such as age, virulence, length of time since isolation, etc., was found.” The commission selected as most suitable for use, in the British Army vaccine, the now well known Rawlins strain of typhoid bacillus, which was isolated in 1900 from the spleen of a fatal case of typhoid fever and had already been cultivated on artificial media for a period of 4 years.

In discussing the reasons for adopting the Rawlins strain, Leishman⁸ called attention to the current controversy as to the relative merits of cultures of high and low virulence; and stated that an attempt was made to settle this point by animal experiments using two vaccines: “one prepared from our usual non-virulent strain, the other from a strain recently isolated from a fatal case of enteric fever and which was found to possess a high degree of virulence for guinea pigs.” The two vaccines were inoculated into rabbits in amounts comparable, on the basis of weight, to the doses used in man; and quantitative estimations were made of the various protective substances which appeared in the blood during the following weeks. While the first experiments showed a slight margin in favor of the vaccine prepared from the recently isolated, more virulent strain, this was not confirmed, as in later experiment both vaccines gave identical results. Consequently Leishman made the following statement:

We concluded that a virulent strain might perhaps be expected to give rise to a slightly higher degree of immunity but that the difference in this respect was not marked. We have also convinced ourselves by many experiments that the protective substances elaborated in response to inoculations of a non-virulent vaccine are highly active *in vitro* against a freshly isolated and virulent strain of *Bacillus typhosus*. We have made no change then in this respect, but adhere to the use of a strain of typhoid which has been long sub-cultured in the laboratory, and now

possesses but a very slight degree of virulence for guinea pigs. We are influenced in this decision, however, by another factor—namely, the fact that vaccines prepared from a virulent strain of *B. typhosus* give rise in man to more severe reactions both local and general.

It is extremely probable that not all strains of non-virulent typhoid bacilli are equally suitable for use in vaccines; we have reason to believe that that which we employ is exceptionally so. Wassermann considers that the virulence of the organism is not of so much importance as its affinity for the specific amboceptors and in this our non-virulent strains excel.

In view of the recent interest in dissociation it is of importance to note that certain physical growth characteristics were also considered in selecting the Rawlins strain. To quote Leishman⁹:

It was originally intended to employ for this purpose a strain "G," isolated from the spleen at Netley 5 years ago, which had been largely employed by Dr. Wright and myself in the preparation of vaccine, and is still employed by Dr. Wright for this purpose. In our preliminary work, however, it was found to possess the disadvantage of being a strain which could only be emulsified from an agar culture with great difficulty and at the sacrifice of more time than we were likely to be able to afford. Further experiment resulted in the selection of another strain "R," of similar origin and of about the same age, which had also been extensively employed at Netley in the preparation of vaccine. This strain was one which furnished a very even and satisfactory emulsion from an agar culture and was thus more suitable for some parts of the delicate experimental work which lay before us. Both these strains being of low virulence, and of proved suitability for inoculation, preference was accordingly given to that which promised to give more regular results in our test experiments, and the strain "R" was, therefore employed, both in the preparation of the vaccine and in the daily quantitative tests of the protective substances developed in the blood of the inoculated.

Thus it appears that when adopted for use in the British Army vaccine in 1904, the Rawlins strain, which was then 4 years old, was selected because of its relatively low toxicity for guinea pigs and man, its satisfactory stimulation of certain antibodies and because

it had at least one characteristic of what has since been designated as a smooth type of *E. typhi*; that is, it produced a uniform diffuse growth in broth, and suspensions from agar cultures were not agglutinated by physiological salt solution.

This strain was used by the British Army from 1904 until 1933; and a sub-strain obtained in 1908 has been used since that date in all typhoid vaccines manufactured for the United States Army and Navy. Still other sub-strains have been furnished to public health and commercial laboratories throughout the world; and it seems safe to say that the descendants of the so-called Rawlins culture of typhoid bacillus have been used more extensively than any other for vaccine production. Thus by virtue of extensive use in prophylactic vaccines, if for no other reason, this strain has acquired an importance which demands for it serious consideration.

THE U. S. ARMY SUB-STRAIN OF THE RAWLINS CULTURE

Typhoid vaccination was introduced into the U. S. Army in 1908 by General F. F. Russell who, after a thorough study of the procedures used in the English and German Armies, adopted a modification of the two methods and selected for use in the American vaccine a sub-strain of the British Rawlins culture. In a discussion of antityphoid vaccination in 1913, Russell¹⁰ commented on this strain as follows:

The English vaccine is, therefore, a killed broth culture made from a single strain of the bacillus, which was originally selected because it emulsified well from agar slants. Preliminary trials of this organism showed that it agglutinated well in immune serum, and produced in good quantities all measurable kinds of antibodies in animals and man. This strain is still in use in England and in our military service, and although we have searched from time to time for a strain with greater antigenic properties, none has yet been found.

As this same Rawlins sub-strain has been used continuously in our Army, it has been responsible for whatever protection we have derived from typhoid vaccination. However, from time to time theoretical objections have been raised concerning its relative effectiveness.

THEORETICAL OBJECTIONS TO THE RAWLINS STRAIN

In 1917 Weiss¹¹ questioned the advisability of using the Rawlins strain in vaccines, on the assumption that it belonged to a relatively small subgroup which differed from the majority of typhoid cultures. He reported that, of 31 typhoid strains which he investigated, 6 failed to produce acid in xylose broth, and that 4 of these appeared to be atypical antigenically in that they did not absorb agglutinins for the xylose-fermenting strains. Observing that a Rawlins strain was one of those that failed to ferment xylose, Weiss made the following statement:

We wish also to emphasize that on a basis of these results we believe that in typhoid prophylaxis the single "Rawlings" vaccine may not give complete protection. Recent cases of typhoid fever among soldiers who have received the prophylactic treatment have come to our attention and lend weight to our belief. We would recommend that a polyvalent vaccine, or one made from an organism which is more representative of the whole group should be used.

However, Teague and McWilliams,¹² by plating and selecting different colonies of a single culture of *B. typhosus*, showed that differences, with regard to the absorption of agglutinins, could be obtained at times with these subcultures, similar to those obtained by Weiss when using his xylose-fermenting and non-fermenting strains. Therefore, it was decided that the evidence offered by Weiss did not warrant the addition of other strains to the vaccine prepared at the Army Medical School. During 1918, strains of typhoid bacilli that

apparently failed to ferment xylose were encountered in cultures obtained from certain American soldiers in France; and the question of xylose fermentation was investigated under the direction of General F. F. Russell, by Teague and Morishima.¹³ These workers studied 116 strains of typhoid bacilli including the U. S. Army, Rawlins culture, and discovered that all of them fermented xylose, although about 8 per cent were slow fermenters—acting through the production of "daughter colonies." Similar observations were made concerning the fermentation of arabinose, and other sugars; and it was concluded that there was no evidence to justify Weiss's suggested division of typhoid bacilli into separate groups.

More recently there has been some question as to the value of typhoid vaccines in general, because of observations which indicate that the inoculation of vaccines into man fails to produce the so-called somatic or "O" type antibodies in such concentrations as are observed after recovery from typhoid fever. While flagellar and somatic antigens were differentiated in 1903 by Smith and Reagh,¹⁴ their significance was not recognized until later when Weil and Felix¹⁵ and their followers investigated the "H" or flagellar and the "O," or somatic antigens, of *Proteus* X19, and later extended these observations to organisms of the typhoid-paratyphoid group. In 1924 Burnet¹⁶ showed that both the "flocular or H" and the "granular or O" types of agglutinins were developed about equally in the serum of cases of typhoid fever, while the agglutinins in the serum of vaccinated persons were mainly of the H type. Felix,¹⁷ who associated the O type agglutinins with immune body, failed to demonstrate such anti-bodies in sera from vaccinated men. Consequently he and his followers believe that our present typhoid vaccines are not likely to give adequate

protection. Experiments performed by Arkwright,¹⁸ in 1927, appeared to support this view of the importance of the O antigen, as he observed that guinea pigs were protected as well by vaccines containing only the O antigens as by others which contained both O and H antigens. However, Springut¹⁹ and Ibrahim, and Schutze²⁰ in vaccinating mice against *Bact. aertrycke* infection, obtained results which indicate that although the H antigen alone was of little immunizing value, the combination of H and O antigens was more effective than the O alone.

While the importance of the O type antigens is now generally recognized, there remains considerable doubt concerning the significance of O antibodies as indicators of protective immunity; and it appears that theories as to the supposed ineffectiveness of typhoid vaccines based on such reactions may be erroneous. This is suggested by such results as those obtained by Greenwood and Topley²¹ in experiments with mice vaccinated with various antigens of *Bact. aertrycke*. These investigators observed that, among those animals which were protected against infection by vaccines containing O antigens, only a minority developed O type agglutinins in detectable amounts. Whitehead²² in 1927 failed to demonstrate granular agglutinins in the sera of 6 out of 7 persons inoculated with the English Army vaccine, but he also obtained negative results with the sera of 12 typhoid convalescents. However, inoculation of the vaccine into rabbits was followed by production of granular agglutinins in large amounts. The fact that vaccination usually produces a higher O agglutinin content in the serum of rabbits than in man has been noted by many observers, including the authors, Cox,²³ and others. In spite of the speculation as to the possible significance of O antibodies, we have no proof that their titer indicates the

degree of protection afforded by typhoid vaccines and we concur in the following comment made by Topley and Wilson²¹ in 1931:

It would seem that circulating antibodies in very low titer or a heightened reactivity of the tissues to the O antigen afford an adequate degree of protection.

Another problem of considerable current interest is the question as to the relative effectiveness of vaccines prepared with the so-called "smooth" and "rough" types of typhoid bacilli. The investigations on bacterial dissociation, by Baerthlein²⁴ 1918, Arkwright²⁵ 1920-1927, and deKruif²⁶ 1921, gave evidence that certain of the many obvious cultural changes, which are to be observed among the descendants of a single pure strain of bacteria, may be associated with alterations in other important characteristics including physiological reactions, chemical and antigenic structure, virulence, etc. Arkwright²⁷ from his studies of the colon-typhoid-dysentery group, called attention to the fact that the so-called normal or "smooth" types of these organisms possess certain common characteristics, including: (a) the formation of typically round, domed, smooth, shining, translucent, non-granular colonies on solid media; (b) the development of a uniformly turbid growth in broth; and (c) the production of agar growths which form uniform suspensions in 0.85 per cent solution of sodium chloride. He observed that such smooth cultures might give rise to several different variants, of which the most important was the form designated as "rough." This so-called rough variant type is characterized by: (a) colonies which are dry, flattened, irregular in outline and surface, and coarsely granular; (b) by granular, precipitated growths in broth; and (c) by the fact that organisms from agar cultures spontaneously agglutinate in 0.85 per cent salt solution. Such S

to R dissociation is of considerable practical importance because, when complete, it is often accompanied by other changes including a decreased virulence, and by marked antigenic alteration in which the specific somatic O antigen of the smooth type is lost and is apparently replaced by a rough somatic antigen which may be common to several related species. As it has been shown that the smooth to rough, and the motile to non-motile types of variation may occur independently, or simultaneously, it is now recognized that motile organisms of the colon-typhoid group may conform to either of the following forms (1) smooth motile, containing both H and O antigens; (2) smooth non-motile containing O antigen but no H; (3) rough motile retaining H antigen but with the O replaced by R or Ø antigen; and (4) rough non-motile containing only the R or Ø antigen. The work of Zinsser and Parker²⁸ (1923), Furth and Landsteiner²⁹ (1928), White³⁰ (1928), etc., suggests that the S—R change in the typhoid-paratyphoid group may be associated with chemical alterations similar to those observed during the dissociation of pneumococci (Heidelberger and Avery³¹ 1923) (Reimann³² 1925). In other words, it seems possible (Zinsser³³) that the complete somatic antigen of the smooth type consists of two parts, a nucleo-protein common to all forms, and a soluble specific substance which alone produces no antibody but gives its specificity to the antigen as a whole, while the rough variants lose the SSS, retaining the nonspecific nucleo-protein antigen.

In vaccination experiments using guinea pigs and *Bact. paratyphosus* A, Arkwright¹⁸ observed that "smooth" vaccines protected against a subsequent test injection of living smooth organisms while "rough" vaccines failed. Similar, but less striking, results were ob-

tained with the typhoid bacillus. Likewise, in experiments with mice and *Bact. aertrycke*, various workers, including Springut,¹⁹ Ibrahim and Schutze,²⁰ and Greenwood and Topley,²¹ have also shown that vaccines prepared with rough cultures were much less effective than those made from cultures of the smooth type. In 1930 Grinnell³⁴ observed that vaccination of rabbits, and of man, with a rough sub-strain of *E. typhi* Rawlins produced little or no increase in the specific bactericidal power of the blood as compared with similar vaccinations with smooth typhoid bacilli. However, noting that the rough vaccine produced agglutinins for the smooth strains, he concluded that the agglutination reaction is not a satisfactory test for immunity, and that, in so far as bactericidal action is an index of resistance, rough strain vaccines are of relatively slight prophylactic value. Grinnell³⁵ (1932) made a study of 12 Rawlins cultures obtained from different laboratories engaged in making antityphoid vaccine, comparing them with freshly isolated smooth strains with respect to morphology, motility, colony form, nature of the growth in broth, growth in 10 per cent normal horse serum broth, and stability of suspension in normal saline solution. He concluded that 1 of these Rawlins strains corresponded in cultural and serological characteristics to the classical rough variant, and that the remaining 11 gave cultural reactions intermediate between the rough and smooth types; also that "in the stability of their suspensions in normal salt solution and in their agglutinability in the serum of rabbits immunized with non-motile smooth antigens—criteria on which Arkwright lays great stress—they corresponded to the smooth phase." However, he states that "as judged by the more significant tests of the bactericidal action of normal blood and by their virulence for mice, they should

be considered rough." Grinnell reported several experiments in which he observed: (a) that organisms from 18 hour broth Rawlins cultures were killed by quantities of fresh defibrinated guinea pig blood which had no bactericidal effect on the smooth cultures; (b) that when 0.1 c.c. amounts of 18 hour broth cultures were inoculated into mice, 95 per cent of those which received the smooth cultures died, while death occurred in only 3.3 per cent of those injected with the Rawlins culture; and (c) that a large proportion of mice, vaccinated with smooth strains, survived a subsequent intraperitoneal dose of a smooth culture, whereas most of those, vaccinated with a Rawlins strain, failed to survive this toxic dose.

Grinnell concludes from these experiments that

. . . since the Rawlins strain differs from the smooth phase of *Bact. typhosum* in cultural characteristics and in virulence, and is much less efficient than smooth strains as a protective antigen; . . . it would seem but logical to substitute virulent smooth cultures for the very old Rawlins strain, if we are to expect the maximum protection from antityphoid vaccination.

This conclusion appears to us to be predicated entirely upon the assumptions (a) that the protective value of a typhoid vaccine can be measured by demonstrable antigen-antibody reactions; (b) that the infectivity for man of a typhoid culture is proportional to its toxic action when introduced into the peritoneum of a mouse; (c) that the degree of protection afforded a mouse against the toxicity of a strain is an index of the protection afforded man against natural invasion and infection with the same strain; and (d) that the Rawlins strain is a fixed entity irreversibly dissociated to a degree rendering it unfit for vaccine production, and that none of its sub-strains have been, or can be, maintained in a satisfactory dissociative state. On the other

hand, Maltaner³⁶ found that, measured by protection of rabbits against intravenous inoculations of living cultures, rough typhoid vaccines were distinctly superior to the smooth, even against smooth organisms. These results led him to the following conclusion:

Certainly the suggestion that smooth organisms be substituted for those of intermediate types, which have been most commonly employed, is not at present justified.

Such contradictory observations emphasize the fact that we still have no satisfactory laboratory criterion for determining the practical value of a typhoid vaccine, and leave unanswered the question of the relative merits of smooth and rough vaccines. Therefore, we propose to review the history of the U. S. Army Rawlins sub-strain and to look for evidence of dissociation both in the culture and in the practical experience with the vaccine. If this sub-strain has dissociated during the 25 years of its use, and if dissociation has significantly affected the protective action of the vaccine, then such alteration should be clearly reflected in the practical results obtained with the vaccine.

DISSOCIATIVE CHARACTERISTICS OF THE U. S. ARMY RAWLINS SUB-STRAIN

As indicated above, the Rawlins strain was isolated 33 years ago from the spleen of a fatal case of typhoid fever. After 4 years of cultivation on artificial media it was selected by Leishman for use in vaccines prepared for the British Army, because of its relatively low toxicity for guinea pigs, its satisfactory antibody production, and because of the fact that it formed a uniform suspension in salt solution. After the strain had been cultivated in England for a period of 8 years it was selected by General Russell for vaccine production in the U. S. Army.

Since its introduction at our Army Medical School, this Rawlins sub-strain has been maintained under conditions

which have probably kept its dissociative characteristics rather stable and uniform. The stock vaccine culture has been kept on agar slants, in sealed tubes, at refrigerator temperature; and at intervals of 20 to 30 days the cultures have been checked for purity and transferred to new media. For the production of vaccine, transplants are made from stock cultures to nutrient agar in Petri plates, and from these cultures about 12 typical colonies are selected for transfer to large, nutrient-agar slants, and to Russell's double-sugar media. After incubation, the cultures on double-sugar are tested with stock agglutinating serum containing both H and O agglutinins; and broth is added to the agar slant cultures. After several hours, the latter broth suspension of the "seed" culture is used for the inoculation of nutrient agar in Kolle flasks, which are then incubated at 37° C. for 24 hours. The organisms are then removed, suspended in buffered physiological salt solution, killed by heating in a bath at 56° C., and, after counting, 0.25 per cent cresol is added. The bacterial content is estimated with the Helber counting chamber, after which the vaccine is diluted to the desired concentration with 0.85 NaCl solution. The control tests carried out with each lot of vaccine include: (a) microscopic examination of unstained and Gram stained preparations, (b) various checks to rule out contamination and insure sterility, (c) the inoculation of mice, guinea pigs, and rabbits to detect abnormal toxicity, (d) study of the growth on agar to insure obtaining only "typical" colonies, (e) checks to avoid the use of organisms which produce a granular type of growth in broth or clump in physiological salt solution, (f) tests for agglutination with typhoid antiserum, and (g) tests for the production of a satisfactory agglutinin titer in rabbits inoculated with the vaccine. With a

few modifications noted below, this is essentially the technic followed since 1908.

The question will now be considered as to the classification of the U. S. Army Rawlins sub-strain in terms of Arkwright's criteria for smooth and rough dissociative types.

Colony Morphology—While the early records of the vaccine laboratory contain no detailed description of the morphology of the colonies, it is obvious that an attempt has always been made to select colonies of a uniform appearance since, from the beginning, it is recorded that only "typical" forms were used for the "seed" vaccine cultures. In Russell's³⁷ original records it is noted, at intervals, that "the most even looking" or "most uniform colonies" were picked; and at other times, it is stated that uneven growths appeared which had to be scraped off the agar, and that they were discarded. However, since most of the earlier texts on bacteriology described the typical typhoid colony as being of the "grape-leaf" or "veined" type on gelatin, it seems quite probable that, from the beginning, the U. S. Army Rawlins colonies have been somewhat irregular in outline. In this connection it is of interest to note that Arkwright²⁷ states that the veined or medusoid colonies, of the typhoid and paratyphoid groups, may have the same serological properties as those of the normal smooth colony.

During the past 5 years the colonies have been studied rather intensively; and an attempt has been made to select those more nearly conforming to the so-called smooth type. As a rule these colonies are not completely circular, showing some irregularity of outline, but otherwise they have the morphological characteristics of the smooth type. It should be added that while the criteria used routinely in the selection of colonies for use in the vaccine

have not been radically changed, it has been shown experimentally that it is possible to produce perfectly typical, smooth colonies with the U. S. Army Rawlins by various methods.

Suspensibility in Physiological Salt Solution—On rare occasions during the past 25 years, individual cultures of this strain have shown a tendency to agglutinate spontaneously in salt solution; but all such cultures have been discarded. Thus, throughout this period, there has been an unconscious but consistent selection of organisms possessing the smooth characteristic of uniform suspensibility in normal salt solution.

In recent experiments at the Army Medical School, it has been shown that both the Rawlins and a recently isolated, smooth, typhoid strain reacted similarly when suspended in NaCl solutions of 0.2, 0.4, 0.8, 1.6, 3.2 and 6.4 per cent. After incubation at 37° C. and at 50–55° C. for 19 hours, both strains remained in suspension; while a rough control strain (Dorset) showed clumping in salt solutions of 0.8 to 6.4 per cent.

Growth in Broth—For the reason given above, the character of the growth in broth has also been of the smooth type. While variants can be obtained which produce a granular growth in fluid media, such variants have not been used in the vaccine. When grown in nutrient broth media, containing 0.5, 1, 2, 3, 4, and 5 per cent sodium chloride respectively, there was no noticeable difference in the turbidity or sedimentation produced by the Rawlins and the recently isolated smooth strains; while a rough strain showed agglutination in all tubes within 24 hours.

Antigenic Structure—Since the beginning it has been an arbitrary requirement that the culture used for each lot of vaccine shall agglutinate, to a satisfactory titer, with a stock diagnostic antiserum; and that, when inocu-

lated into rabbits, the cultures shall produce agglutinins to a satisfactory titer. In more recent years it has been observed that the agglutinins produced in rabbits by U. S. Army Rawlins vaccines include both the H and O antigens. Livesay,³⁸ in unpublished experiments, has observed that with rough and smooth antisera the H and O antigens of this strain gave agglutination reactions similar to those obtained with smooth strains, including one recently isolated from a case of typhoid fever. As noted by Craig,³⁹ in 1929, individuals inoculated with the U. S. Army Rawlins vaccines may show in their sera other antibodies including precipitins and complement-fixing bodies.

Virulence—The original Rawlins strain was selected because of its relatively low virulence (toxicity?) for guinea pigs. Nichols⁴⁰ observed in 1915 that the U. S. Army sub-strain showed a relatively low virulence for guinea pigs and rabbits, but that it was distinctly toxic. We have no recent data concerning its virulence for man. However, Bulloch⁴¹ mentions two severe cases of typhoid which occurred "at the Royal Army Medical College in the vaccine department in workers who were employed in preparing vaccines with the old culture (Rawlins)."

It appears that the Rawlins sub-strain, as maintained at the Army Medical School, produces colonies which are slightly irregular in outline but do not conform to the morphological picture of a rough organism; and that in its other cultural, physical and antigenic reactions it behaves as a typically smooth organism. Furthermore, the records of the vaccine department indicate that there has probably been little change, in the dissociative state of this sub-strain, during the 25 years of its use.

At this point it may be well to warn against the present tendency to attrib-

ute fixed dissociative characteristics to any particular strain of organisms, without considering the environmental conditions to which it is exposed. While it is true that certain typhoid strains appear to have a greater tendency to variation than others, it is obvious that even such stable organisms as those descended from the original Rawlins culture are susceptible to such influences, and may be obtained and kept in either the motile or non-motile, smooth, intermediate or rough condition as desired. Among the many Rawlins sub-strains, which have been cultivated in different laboratories, it is possible to find some which are typically smooth in all their characteristics, many that are intermediate, and others that are entirely rough. In fact, sub-strains of the different types may be developed in any laboratory by a variety of methods. Larkum,⁴² for example, recommends for the production of smooth cultures, frequent intraperitoneal passage through guinea pigs. Others have obtained similar results by passage through other animals. Cox²³ has advised the use of Huntton's hormone agar for maintaining cultures in a smooth state. In unpublished experiments performed at the Army Medical School, Simmons⁴³ and Livesay³⁸ have shown that typical, smooth-type colonies can be obtained by various selective culture methods.

A most instructive example, of the ease with which a Rawlins culture may be altered, is furnished by the recent experience of Perry, Findlay, and Bensted⁴⁴ with the English Army vaccine strain. Cultures of this strain, examined by Whitehead²² in 1927, were of an intermediate-smooth type, with characteristics quite similar to those of the U. S. Army sub-strain. However, Perry, Findlay, and Bensted reported in April, 1933, that a culture of the English vaccine strain which they studied was extremely rough, having changed

both culturally and antigenically. Using Grinnell's technic for estimating virulence by mouse inoculation, it was found that this rough variant had a minimal lethal dose estimated at 500 millions, when compared with more recently isolated smooth cultures, including an Indian strain, "Allahabad," which was lethal in doses of 40 millions. They observed that this rough Rawlins culture "failed consistently to protect mice against a subsequent lethal dose of a virulent strain of *Bact. typhosum*, whereas a series of mice previously inoculated with a vaccine manufactured from a recently isolated virulent strain were effectively protected against a similar test dose." Incidentally it was noted that, even though the smooth strains had been recently isolated, careful colony selection was necessary, due to the fact that the usual rough variants were constantly encountered; also that, while vaccine prepared from the Allahabad smooth strain were most effective, the vaccine made from its rough variant gave almost as satisfactory results. The authors concluded that, in view of Grinnell's work, and of their own investigation, they were "of the opinion that the Rawlins strain should be discarded and the strain Allahabad substituted for it in the Army typhoid-paratyphoid vaccine."

However, it is of interest to note that within a few months' time the same authors⁴⁵ published a second report in which they observed that, while most workers acquainted with the Rawlins typhoid bacillus are in agreement as to the predominance of its rough character, they had recently received two cultures of the strain, both of which produced definite smooth colonies, which were antigenically pure and showed little or no tendency to throw off rough variants; also, that the virulence of these smooth Rawlins sub-strains was in sharp contrast to that of their rough Rawlins culture. Moreover, they re-

ported that they had since rejuvenated their rough Rawlins culture by simply passing it through mice in doses just sufficient to kill in 24 to 48 hours. Cultures from the heartblood of such animals yielded profuse growths of pure smooth colonies, and these organisms consistently killed mice in a dose of 40 millions. Their comments on this smooth Rawlins culture follow:

It is now apparent from the mouse experiments that have been detailed that rejuvenation of this senile strain can be effected by certain *in vivo* methods. By such methods the original Rawlings strain has been so transformed that its virulence is possibly of a higher degree now than when it was originally employed as a typhoid vaccine. At the present time it is not possible to state how permanent this change may be; no alteration in this respect, however, has been noted during the last 2 months. *It has also been ascertained that this smooth Rawlings strain is as effective in protecting mice as any of the more recently isolated strains with which we have worked (Italics ours).* Possibly, further investigation may prove its superiority in this respect, and these comparative estimations are in progress. *It is, however, questionable whether so highly virulent an organism is suitable for inoculation into man (Italics ours).* In addition to the criterion of its protective properties, antecedent experience should prove that its administration is not followed by severe after-effects. The strain of typhoid bacillus (Allahabad) at present included in the Army vaccine was subjected to extensive trials, both from the protective and reaction aspects, before its selection was approved. Until such time as more experience is obtained of the after-effects of the inoculation of this smooth Rawlings strain into man it is not proposed to include it in the typhoid-paratyphoid vaccine.

This experience with the English Rawlins vaccine strain indicates quite clearly that, by a single passage, even a very rough culture can be transformed into a smooth type which is virulent for mice, and effective in Grinnell's mouse protection test. It also indicates that if "smoothness" and "roughness" are to be held as important criteria for the selection of vaccine strains of

the typhoid bacillus, our practical problem is not so much concerned with the search for recently isolated cultures as with the question as to what dissociative state is desirable, and what methods are most suitable for the maintenance of our present culture in the most effective condition.

Since the question as to what constitutes the most desirable dissociative state has not been satisfactorily answered by laboratory tests, the following analysis of the practical results obtained with typhoid vaccination in the U. S. Army and Navy should be of considerable interest as a practical approach to the possible solution of the problem.

The ideal method of determining the relative effectiveness of a typhoid vaccine would be to administer virulent typhoid bacilli by mouth to large groups of vaccinated individuals; but such experiments are not practicable. Consequently the best information available is afforded by statistical studies dealing with the incidence of typhoid fever among vaccinated persons.

Before proceeding with the statistical analysis it should be noted that on several occasions vaccinated individuals have accidentally swallowed living typhoid bacilli without developing typhoid fever.

LABORATORY EXPOSURE TO INFECTION

In a case observed by Grant⁴⁶ in 1921, an assistant in the 8th Corps Area Laboratory sucked into his mouth 0.5 c.c. of a heavy suspension of living typhoid culture, strain K110. His mouth was washed out with 50 per cent alcohol and he was given 0.5 c.c. of Army vaccine. Four days later he developed headache and malaise, but there was no fever, or other symptom, except slight headache on the 8th day. Typhoid bacilli were isolated from the feces on the 12th day after the accident, and again on the 3 succeeding days,

but none were found in the blood. This man had received the U. S. Army vaccine 14 months previously.

In 1922 Sergeant George F. Luipold, while working in the vaccine department at the Army Medical School, swallowed about 25 c.c. of a saline suspension of the U. S. Army Rawlins culture containing about 3,000 million organisms per c.c. After rinsing his mouth with a cresol solution and with alcohol, he was given a subcutaneous injection of vaccine and kept in bed for 1 week. Cultures of stool, urine, and blood taken during this week were negative. On the 4th day he developed a temperature of 101 which disappeared after 2 days, but aside from a sore throat there were no other symptoms. Prior to this accident, the Sergeant had received 3 complete courses of Rawlins vaccines, the last in 1920.

THE U. S. ARMY VACCINE AND TYPHOID FEVER

We know of few convincing data bearing directly upon the effectiveness of antityphoid vaccination. Many of the available data are from the British experience in the Boer War, which was with a vaccine now known to have been faultily prepared. When universal compulsory vaccination was introduced in

FIGURE I

Logistic Curve Fitted to Mortality from Typhoid Fever, Registration Area of 1900 (Less District of Columbia), 1900-1932
The shaded band defines the limits of 4 P.E. of the ordinates of the curve.

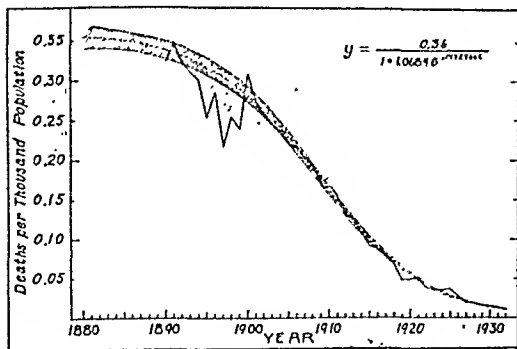
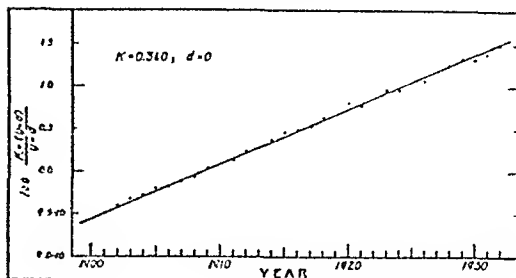


FIGURE II

Plot of $\text{Log.} \frac{K - (y - d)}{y - d}$ for Curve in Figure I

If the curve fit perfectly, all dots would fall upon the line.



the United States Army and Navy, obviously there were no controls. Therefore, the only approach to the question of the effectiveness of our vaccine lies in an inquiry into the effectiveness of the control of typhoid and paratyphoid fevers before and after the advent of the vaccine.

Mortality from typhoid fever has been declining in the civil population of the United States since about 1900. The Registration Area of 1900 comprised the states of Connecticut, Indiana, Maine, Massachusetts, Michigan, New Hampshire, New Jersey, New York, Rhode Island, Vermont, and the District of Columbia. It would be difficult to select another comparable area in the United States where public health agencies were better organized and supported; and the experience of this area will be accepted by most observers as representing an experience decidedly above average in effectiveness in the control of typhoid fever by sanitation.

The mortality from typhoid fever in the Registration Area of 1900 (less the District of Columbia), from 1890 to 1932, is shown in Figure I. A logistic curve, with 4 times the probable errors of its ordinates, has been fitted to the observations from 1900 on. The fit is remarkably good and this curve can be accepted as indicating the trend of typhoid mortality in this area between these dates. The trough during the

90's need not concern us; it may be due to indifferent reporting (since a large part of the area was not then in the Registration Area), or it may be due to unexplained events in the natural history of typhoid fever. The important facts are: (a) that typhoid fever was at a certain level of incidence in 1900, and (b) that this level has declined since that time in a surprisingly orderly fashion. The fit of this curve is better shown, perhaps, by Figure II.

The equation of the logistic curve is $y - d = \frac{K}{1 + Ce^{rt}}$. This says, in simple language, that the upper and lower limits of the variable y are K and d , respectively; the rate of variation of y is expressed by r as the exponent of the Napierian e , and t (time) expresses the duration of the influence of r .

r , then, is the inherent rate of change of y . Consequently, in this case, r is the index of the influence of *all the factors* tending to reduce the mortality from typhoid fever. Since this curve fits very well throughout the range 1900-1932, and the value of r remains constant (0.1492966), the sum of the influence of all the factors tending to reduce typhoid mortality in this population has not changed significantly since 1900. It is conceivable, but scarcely probable, that different factors, exerting exactly the same amount of influence, were substituted from time to time. The most logical inference is that the same factors were in play in 1930 as in 1900, and that these were improvement of water supplies, sanitary sewage disposal, and possibly improvement in the personal and occupational hygiene of food handlers.

Now there is some indication that at least one other factor was introduced around 1920. The best fitting curve for the observations from 1900 to 1921 appears to be one asymptotic to 0.015 (deaths per 1,000), or $d = 0.015$. The curve shown in Figure I is asymptotic

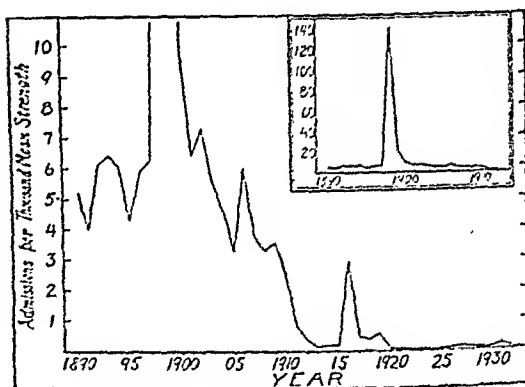
to zero. This difference is, so far, too small to be regarded seriously. It *may* represent the effect of the increasing use of vaccines among the civil population.

In any event, whatever r may represent, mortality from typhoid fever in the Registration Area of 1900 has declined in the past 30 years in a regular and orderly fashion that is satisfactorily expressed by a logistic curve, and this curve may be accepted as the measure of typhoid fever in a representative civil population provided with health agencies above the average in accomplishment.

The incidence of typhoid and paratyphoid fevers in the U. S. Army from 1890 to 1932 is shown in Figure III.

FIGURE III

Admission Rates, Typhoid and Paratyphoid Fevers, All American Troops, U. S. Army, 1890-1932

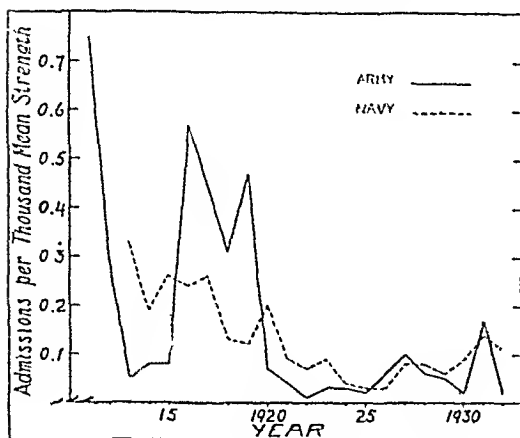


The smaller population, the variations in exposure due to war, mobilizations, geographic distributions of troops, etc., and the possible effect of immunity acquired by attacks of the disease—these all contribute to the irregularity of the line. Paratyphoid fevers were not distinguished from typhoid until 1911; so the inclusion of all enteric fevers gives a more accurate picture. The sharp peak in 1916 is largely paratyphoid. In Figure IV it will be seen that the typhoid incidence of that year was less than 0.6 per 1,000.

In order to smooth these peaks, 3 year average incidence rates, centering

FIGURE IV

Admission Rates, Typhoid Fever Only,
U. S. Army and Navy, After Introduction
of Typhoid Vaccination



upon each year, are shown in Figure VI. Merely to place the curve where comparison is easiest, and not to suggest case fatality rates, the Registration Area curve $\times 18$ is plotted in this graph. It is evident that the curve expresses fairly well the trend of typhoid in the Army from 1891 to 1908 (the Spanish American War excepted) and in the Navy from 1898 to 1910. Since 3 year average admission rates are used, the effect of the introduction of vaccine is spread over some 5 years, but, even so, the decline in both the Army and Navy is very sharp.

It is to be expected that the advances in sanitation in the military services kept pace with civil improvements. It has been argued that military sanitation has advanced much more rapidly than civil sanitation and that this largely explains the sharp decrease in incidence of the enteric fevers in the Army and Navy in 1911-1912. Aside from the fact that no one knows of any radical innovations in military sanitation adopted at that time, this argument would be much more convincing were the sources of typhoid fever among soldiers to be found only within the sentry lines. As a matter of fact, within recent years at least, the only demonstrable sources of infection have been

outside military control, so that the status of typhoid in the civil population is a fair index of the exposure of the soldier to infection.

During war, and in large concentration camps, this index is unquestionably faulty, but the greater part of our experience with typhoid vaccine has been in small garrisons in time of peace. Those who attribute the sudden drop in incidence in 1911 for the Army and 1912 for the Navy wholly or largely to improvements in sanitation, exhibit a naïve ignorance of the history of typhoid fever in the military services. The experience of the Spanish American War resulted in immediate stressing of the importance of sanitation. Chlorination of water supplies was commenced shortly thereafter, but this practice was extended gradually and relatively slowly. Why the improvements in sanitation should exhibit such a cumulative effect and select the years immediately following the introduction of vaccine to become so prominent has never been explained by critics of vaccination.

Finally, if the vaccine has exerted any influence upon the incidence of typhoid fever in the military service, radical changes in the vaccine itself, or the method of administration, must be reflected in the admission rates for this disease.

It is unnecessary to defend the assertion that the law of diminishing returns operates in the control of typhoid fever. This is to say that, as the incidence of the disease approaches the vanishing point, greater efforts are required to

FIGURE V

Admission Rates, Paratyphoid Fevers Only,
U. S. Army and Navy, After Introduction
of Typhoid Vaccination

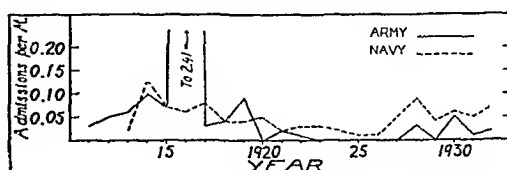
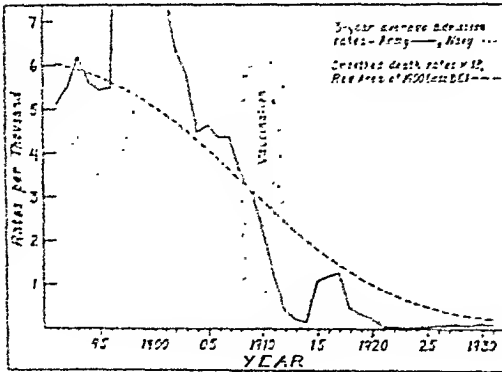


FIGURE VI

Trends of Typhoid and Paratyphoid Fevers, U. S. Army and Navy and Registration Area of 1900 (Less District of Columbia), 1891-1931



effect further reduction. It is a fairly safe prediction that it will require more time and effort to eradicate the final death per 100,000 per annum than it has required to reduce these deaths from 30 in the Registration Area of 1900 to a single one, if such an effort can ever be justified economically.

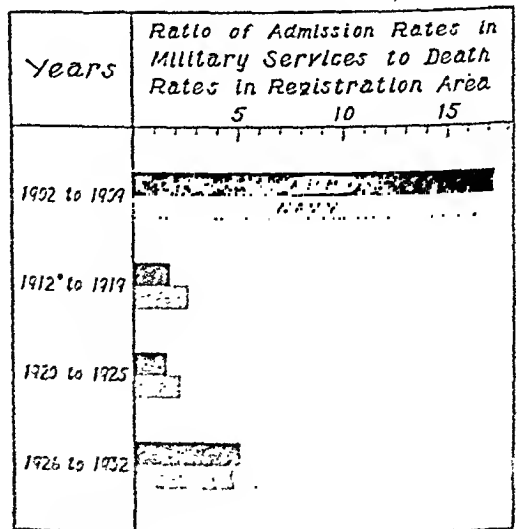
It is to be expected then, that, all other things being equal, the effect of vaccination will be less and less evident as typhoid fever declines in incidence from other measures of control. Figure VII shows the ratio of admissions for typhoid fever in the Army and Navy to deaths from typhoid fever in the Registration Area of 1900 (less D. C.) for 4 different periods. Paratyphoid fevers were not distinguished from typhoid in the military services until after vaccination was introduced. But, since the mortality from paratyphoids is much less than from typhoid, it is necessary to subtract them from the admissions in order not to exaggerate the effect of the vaccine. Omitting the Army's epidemic year of 1916, 83 per cent of all admissions for enteric fevers from 1911 to 1932, in both services were for typhoid fever; and the proportion is surprisingly constant. In order that any error might be on the side of conservatism, for the admissions in the Army and Navy from 1902 to

1909, 20 per cent were deducted as having probably been paratyphoid fevers.

For this period just prior to the introduction of the vaccine, based upon such an estimate, there were approximately 17 admissions for typhoid fever in the Army and Navy for every death from typhoid fever in the Registration Area of 1900 (per 1,000 exposed to risk in each case). Had the control of typhoid fever in the military services and the civil population proceeded apace, this ratio would remain constant; but in the 8-year period immediately following the introduction of the vaccine, this ratio dropped to 1.67 admissions from the Army and 2.55 admissions from the Navy to each death in the Registration Area. This means that, following the introduction of the vaccine in the military services, typhoid control became 9 times as effective as it had been just before; and this improvement took place largely in less than 2 years. Also, it will be remembered that this comparison takes into

FIGURE VII

Number of Admissions per 1,000 for Typhoid Fever Only in the U. S. Army and Navy to Each Death per 1,000 in the Registration Area of 1900 (Less District of Columbia)



*1913 for Navy

account the rapid decline of typhoid fever in the Registration Area during these periods.

In the next period, 1920-1925, there is again a slight advantage for the military services, the ratios for the Army and Navy declining to 1.54 and 2.12, respectively—this despite the fact that the incidence of the disease was rapidly approaching zero in the services and control measures were therefore, less productive of quantitative results.

In the final period of the experience, 1926 to 1932, typhoid fever declined some 56 per cent in the Registration Area. In the Army, the incidence increased from 0.063 to 0.090 per 1,000, while it remained stationary in the Navy (0.087 to 0.084). This resulted in an increase of the ratios of admissions in the military services to deaths in the Registration Area to 5.00 and 4.67 for the Army and Navy, respectively.

In brief, Figure VII shows that typhoid control was decidedly more effective in the military services than in the Registration Area of 1900 for the period 1912-1919; that it was even slightly more satisfactory in the 6 years following, but that something happened to typhoid control in the military services in the 1926-1932 period.

It will be shown later that a radical change was made in the vaccine just prior to this last period. We believe this reversal of the trend of the control of typhoid fever in the military services, following the alteration of the vaccine, to be the most convincing evidence of the rôle played by the vaccine in the control of the disease. Admitting that military sanitation has progressed since 1911, admitting for the sake of argument only that this has been solely responsible for the great reduction in typhoid fever, who will now advance the argument that military sanitation has gone backward since 1924? There have been no wars nor even mobilizations in this period.

The vaccine was changed; and this change has been reflected in the typhoid experience of both the Army and Navy.

MODIFICATIONS OF THE VACCINE

From the time of its introduction until July, 1917, the vaccine consisted of a saline suspension of the Rawlins strain, grown upon beef-extract agar, and killed at 53°-54° C. for 1 hour. The vaccine was standardized at 1 billion organisms per c.c. by the Harrison method in which washed red blood cells were used for comparison. Later experience has shown that the actual bacterial count is only about one-half that of the count estimated by this method, so that during this period the vaccine consisted of approximately 500 million typhoid organisms per c.c.

In July, 1917, 750 million paratyphoid-A organisms, and a like amount of paratyphoid-B, were added to the vaccine, by the same Harrison method of counting which resulted in a vaccine that, by actual count, approximated 500 million typhoid and 750 million paratyphoid organisms.

In July, 1919, the direct method of counting in a Helber chamber was adopted which resulted in doubling the quantities of each of the components of the vaccine; and in April, 1920, the nephelometer method of counting was introduced, using standards established by counts in a Helber chamber.

These nephelometer standards became more and more opaque with age, resulting in higher and higher counts in the vaccine, a fact that was not recognized until some time in 1923. Meanwhile, the reactions had become so severe that in February, 1922, the paratyphoid constituents were reduced to 500 millions each—by the nephelometer estimate, which was still inaccurate, and actually there remained almost 1,500 million paratyphoid organisms per c.c.

The concentration of the vaccine continued to increase with the age of the

standards until, when checked with the Helber chamber late in 1923, the actual count was found to be approximately 1,750 million typhoid and a like amount of paratyphoid organisms per c.c.—a total count of around 3,500 million organisms per c.c., although the prescribed strength was only 2,000 million. The severe reactions again forced a reduction in the strength of the vaccine and, in March, 1924, the vaccine for the Army was re-standardized by direct count with the Helber chamber at 500 million typhoid, 250 million para-A and 250 million para-B organisms per c.c. At this time the Navy discontinued the paratyphoid fraction and their vaccine was standardized at 1,000 million typhoid organisms per c.c. Two other changes were made at about the same time: veal infusion agar was substituted for the beef-extract media and the killing point was increased to 56° C. for 1 hour.

In October, 1927, the Army vaccine was again modified by discontinuing the para-B fraction and increasing the typhoid fraction to 750 million per c.c.

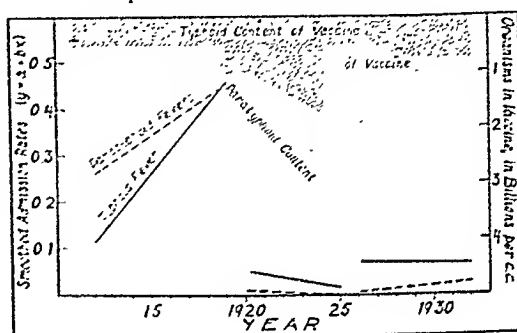
Based upon the physical characteristics and method of production, the total experience with the Army typhoid vaccine falls into three more or less homogeneous periods: (1) From 1911 to July, 1919. During this period, with the exception of less than 2 years during the World War when the paratyphoid fractions were first added, the vaccine consisted of about 500 million typhoid organisms per c.c. (2) From July, 1919, to March, 1924. In this period the dose was greatly increased by design and continued to increase for the reason set forth above. (3) From March, 1924, to the present. In this period the dose was reduced, the method of preparation was slightly changed, and the proportion of the constituents of the vaccine for the Army was again altered in 1927.

The most radical changes in the vac-

cine have been in the concentration of the antigen although it is recognized that these may have affected the protective value less than the change of media and the raising of the killing point. It will be seen, however, that a great decrease in the incidence of typhoid and paratyphoid fever followed the increase in dosage of vaccine prepared exactly as before.

FIGURE VIII

Trends of Typhoid and Paratyphoid Fevers, U. S. Army, With Relation to the Composition of the Vaccine



In Figure VIII is plotted: (a) the approximate strength of the vaccine from 1911 to 1932, and (b) the trend of typhoid and paratyphoid fevers in the corresponding periods. A lag of approximately 1 year has been allowed after each major change in the vaccine in order to afford the new vaccine an opportunity to show its effect. The trend is shown, in each case, by a straight line ($y = a + bx$) fitted to the observed incidence rates.

The influences of the border epidemic of 1916 and the World War are exerted toward the end of the first period so that the trend was decidedly upward from the low rates of 1912 to 1915. The strength of the vaccine was low during almost all of this period, and the demands upon the vaccine in 1916 and the World War were much greater than during the garrison days of 1912 and 1913. Extrapolation of a straight line is, of course, decidedly unwise; and it must not be inferred that a continuation

of the World War would have resulted in an increasing amount of typhoid fever. The evidence is to the contrary, it appearing probable that the incidence of enteric fevers approached the peak in 1919. It is evident, however, that the vaccine of that day was inadequate for the maintenance of as low a rate under field conditions as under garrison conditions, although, based upon past experience, the typhoid rate during the World War was phenomenally low, and generally considered satisfactory.

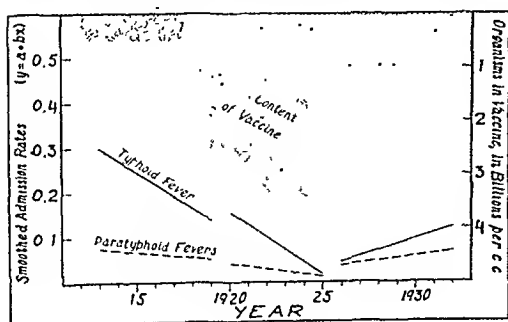
During the second period (1920-1925), characterized by garrison environment and a very strong vaccine, paratyphoid fevers disappeared from the Army, and typhoid approached the vanishing point. The trends of both were decidedly downward with the increasing strength of the vaccine.

The environmental conditions of the Army during the third period were not significantly different from those during the second. In this period, paratyphoid began to appear (see Figure X) and the level of the incidence of typhoid was higher. The trend, measured in this manner, is slightly downward, but this must be accepted with considerable scepticism since the very favorable years of 1930 and 1932 may not be quite representative. The Navy trend is upward during this period.

The Navy experience, shown in Fig-

FIGURE IX

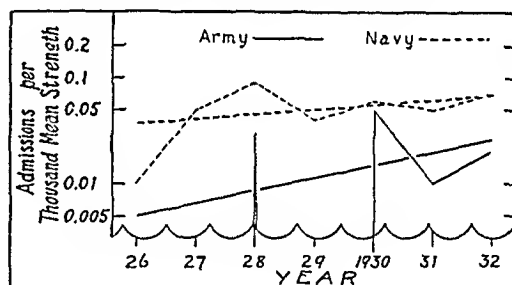
Trends of Typhoid and Paratyphoid Fevers, U. S. Navy, With Relation to the Composition of the Vaccine



ure IX, is very similar. The Navy, possibly by reason of the similarity of hygienic conditions in war and peace, has escaped the epidemics of the Army. Actually, the personnel of the Navy probably are less exposed to the enteric infections in war than they are in peace. The trends of both typhoid and paratyphoid fevers in the first period are downward. In the second period, the rates of decrease are faster than in the first period, while there is a rise in both typhoid and paratyphoid fevers in the third period.

FIGURE X

Trends of Paratyphoid Fevers, U. S. Army and Navy, 1926-1932. During this period the Navy vaccine contained no paratyphoid organisms while the Army vaccine retained a paratyphoid fraction.



These widely separated experiences are in complete agreement and indicate (1) that the low dosage of vaccine from 1911 to 1919 was sufficient to effect a marked reduction in the incidence of typhoid fever, especially under garrison conditions; (2) that the very large doses of vaccine from 1919 to 1924 greatly reduced the incidence of enteric fevers, and this reduction progressed as the vaccine dosage increased through ageing of the standards; and (3) that the reduction of the dosage of the vaccine in 1925 was followed by an increase in the incidence of enteric fevers, but the level has remained appreciably lower than during the 1911-1919 period when the dosage of vaccine was least.

There is another significant reversal of trend shown in Figure VII. So long as the same vaccine was furnished both

the Army and Navy, there was more typhoid fever in the Navy than in the Army. Since the dose of the typhoid fraction was reduced in 1925 in the Army to 500 million and in the Navy to 1,000 million, there has been less typhoid in the Navy than in the Army. This is also illustrated very well in Figure IV.

THE EFFECTIVENESS OF THE PARATYPHOID FRACTION

Nichols⁴⁹ once said that "clinical experience is unanimous that there is no immunity to the paratyphoid infections after typhoid immunization." Clinical experience is, however, notoriously unreliable.

Before the addition of the paratyphoid fraction to the vaccine, there was one epidemic of paratyphoid fever in the Army (1916). This was, however, during a period in which the dosage of the typhoid vaccine was, as is now known, entirely inadequate. Paratyphoid fevers declined in incidence in the Navy before the paratyphoid fraction was added to the vaccine, and, *since the paratyphoid fraction was dropped from the Navy vaccine, paratyphoid fevers have increased less rapidly than typhoid fever in that service.* They have also increased less rapidly than has paratyphoid fever in the Army (see Figure X), which retained a paratyphoid fraction. However, we commend these figures to you with reservations, since there are too few years in which there was any paratyphoid in the Army to make the trend entirely significant.

It is our opinion that the experience suggests that a potent typhoid vaccine may control paratyphoid fever, and that there is no evidence that the reverse is true to the same degree. We feel that, if any reduction of dosage must be made because of toxicity, this reduction should be entirely in the paratyphoid fraction. Further experience

with increased dosage of a monovalent vaccine may lead us to change our opinion.

SUMMARY

The experience with the Army Medical School vaccine has been divided into the periods corresponding to major changes in the production of the vaccine.

During the first two of these periods only the dosage of the vaccine was changed. In the third period the dosage was decreased and, also, the medium used for growing the organism and the temperature at which the vaccine was killed were changed. Any effect of change of media and killing-point cannot be separated from the effect of the reduction of dosage but, from the experience of the first two periods, it would appear that the reduced dosage alone accounts, in whole or in large part, for the increased incidence of enteric fevers in the last period.

Studies of the dissociative characteristics of the U. S. Army sub-strain of the Rawlins culture show that this organism, as used for the production of vaccine, forms an irregularly shaped colony but, otherwise, possesses all of the characteristics of a typical so-called smooth type of organism. Furthermore, the available records indicate that, if there has been any dissociative alteration in this strain since it was brought to the Army Medical School in 1908, it has not been toward roughness. As a matter of fact, there is no laboratory or statistical evidence of any dissociative change. The only indication of decreased effectiveness of the vaccine can be satisfactorily explained on the ground of dosage alone. *The Rawlins strain may not be the best typhoid vaccine strain; but it is our belief that the Army Medical School sub-strain is no worse today than it ever was.* Nor has it been proved that the present state of this sub-strain is

not the optimum for the prevention of typhoid fever in man; or that, when the optimum dissociative state has been determined, the Rawlins strain cannot be so maintained.

In view of these facts, we believe that the Army vaccine can be improved by increasing its bacterial content within the limit of safety.

NOTE: The authors wish to acknowledge the assistance rendered by the staff of the Department of Laboratories, Army Medical School, particularly Major H. R. Livesay, M.C. and Captain F. E. Council, M.C.; and are likewise indebted to Lt. Col. George L. Lull, M.C., of the Statistical Division of the Surgeon General's Office, and Major Virgil H. Cornell, M.C., Curator of the Army Medical Museum.

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A New Life Table for the City of New Haven

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IN 1918 Dublin¹ presented a life table for New Haven, Conn., based upon the population of 1910 and upon the deaths of 1909, 1910, and 1911, with the statement:

It is hoped that the figures as now prepared will be repeated for the 3 year period centering around 1920, and that the work now being carried on by the health authorities of New Haven will be reflected in a material reduction in mortality, with a corresponding increase in the expectation of life.

A new life table for New Haven 20 years later is here given for comparison with that of Dr. Dublin. The population of 1930 and the deaths (by 5 year age periods) of the 3 years 1929, 1930, and 1931 were used. The table was constructed according to Grove,² who has presented the construction of the short form of a life table in complete detail in order that it can be followed by health officials in making tables of their own. In order to obtain figures

for age-periods comparable with those given for the earlier table, the method of osculatory interpolation was used.

The expectation of life at birth in 1929-1931 was 60.65 years. The maximum expectation of life, 62.76 years, was found for the beginning of the second year. At age 10 the average length of life remaining was 55.15 years; at age 20 it was 45.90 years; at age 45, 24.59 years; at age 60, 14.19 years.

The new table is not entirely comparable with that of Dr. Dublin due to the fact that the Connecticut Bureau of Vital Statistics has allocated deaths to place of residence since 1926. However, non-resident deaths and deaths of residents dying elsewhere in Connecticut, New York, and Massachusetts were available for the year 1931, and from these, non-allocated deaths for the 3 years were estimated. The expectations of life calculated from these deaths were, of course, lower than those obtained from the allocated deaths. At birth the expectation of life was 57.86 years, a decrease of 2.79 years from the allocated expectation of life. This figure, compared with that given in Dr. Dublin's table for 1909-1911 (49.37) shows an increase of 8.49 years, for the two decades, in the expectation of life.

Table I indicates a vast improvement in conditions affecting mortality, some credit for which can be reasonably attributed to the effects of the work of the New Haven Depart-

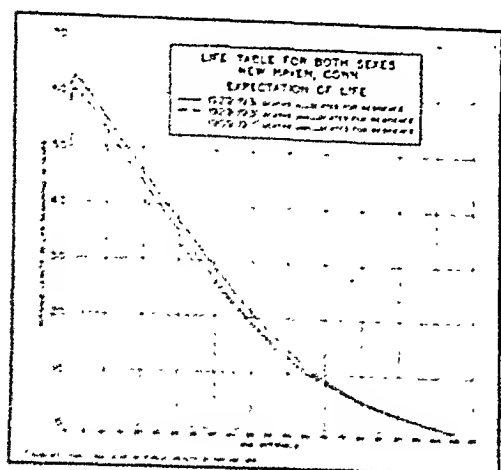


TABLE I

EXPECTATION OF LIFE

Years	1909-1911	1929-1931	1929-1931
	<i>Unallocated Deaths</i>	<i>Unallocated Deaths</i>	<i>Allocated Deaths</i>
0	49.4 years	57.9 years	60.6
1	54.6	60.4	62.8
10	49.6	53.2	55.1
20	41.0	44.0	45.9
30	33.1	35.2	37.0
40	25.8	27.0	28.5
50	18.9	19.5	20.8
60	12.9	13.4	14.2
70	8.5	8.6	9.0

ment of Health and other health agencies in the city. Under the leadership of Dr. John L. Rice, Health Officer for the past 10 years, the health organizations have consistently displayed a high order of efficiency, shown by the fact that New Haven has twice won and once shared first place in the Inter-

chamber Health Conservation Contest for cities in her population class.

The use of life tables for measuring mortality has been restricted in public health circles due to the difficulties of construction. These difficulties should not prevent their use for cities of at least 150,000 population, especially in

TABLE II

LIFE TABLE FOR BOTH SEXES IN THE CITY OF NEW HAVEN, CONN.

1929-1931

<i>Age Interval</i>	<i>No. at Beginning of Age Interval</i>	<i>No. Dying in Age Interval</i>	<i>Probability of Dying During Age Interval</i>	<i>Complete Expectation of Life</i>
	lx	dx	qx	e°x
x	1929-1931	1929-1931	1929-1931	1929-1931
0	100,000	4,924	.04924	60.65
1	95,076	525	.00552	62.76
2	94,551	404	.00427	62.11
3	94,147	301	.00320	61.37
4	93,846	237	.00253	60.57
5	93,609	191	.00204	59.72
10	92,917	91	.00098	55.15
12	92,733	102	.00110	53.26
15	92,389	143	.00155	50.45
20	91,534	211	.00231	45.90
25	90,429	236	.00261	41.43
30	89,147	299	.00335	36.98
35	87,418	429	.00491	32.66
40	84,900	613	.00722	28.55
45	81,646	722	.00884	24.59
50	77,483	1,028	.01327	20.77
55	71,572	1,439	.02011	17.27
60	63,281	1,965	.03105	14.19
65	53,001	2,198	.04148	11.44
70	41,207	2,556	.06202	8.99
75	28,304	2,551	.09012	6.94
80	16,086	2,143	.13323	5.34

view of the fact that health officials may shortly have to resort to the expectation of life in order to demonstrate improvements in conditions affecting mortality. A declining birth rate, restricted immigration, and the subsequent aging of the population may in time cause the death rate to remain stationary and then to rise (Fairchild). When this occurs a crude mortality rate will obviously be of no value in demonstrating changes in mortality, and for

this purpose should be abandoned. The expectation of life is not affected by such changes, and as a more accurate index of mortality, will slowly but certainly come into wider use by health officials.

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State Board Number of the Journal of the American Medical Association

THE annual report of licensure statistics,¹ prepared by the Council on Medical Education and Hospitals of the American Medical Association, is replete with valuable information regarding the progress of medical education, as well as the different forms of licensing procedure. It bears the stamp of accuracy and in this no doubt the executive officers of the different state boards have had an important part.

While distinct advance has been made in the requirements for licensure, there are still a number of states in which the licensure requirements are not equivalent to those of graduation from recognized medical schools. In four states: California, Connecticut, Mississippi and Pennsylvania, only one year of premedical college training is required, and in the five states of Delaware, Massachusetts, Missouri, Nebraska and Ohio, high school graduation or its equivalent constitutes the preliminary education requirement. One year of intern service is now required by nineteen state boards. It is also noted that in nine states 84 graduates

of unapproved medical schools were registered, and in six states 58 osteopaths.

In the interest of interstate endorsement, it is to be hoped that statutory changes will be made in the states concerned, so that medical licensure will be placed on a uniform basis. Present conditions in these states permit registration of individuals having distinctly inadequate training for the practice of medicine.

In only twenty-nine states is naturalization a requisite for licensure. Certainly citizenship should be an essential qualification for the practice of medicine in all the states.

The increased number of candidates who are added to the profession annually is discussed in the interesting editorial by Dr. William D. Cutter,² which presents the real crux of the existing medical economic situation. — *Federation Bulletin*, Federation of State Medical Boards of the United States, 20, 5 (May), 1934.

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Metal Tank for the Preparation of Mass Cultures of Anaerobic Bacteria

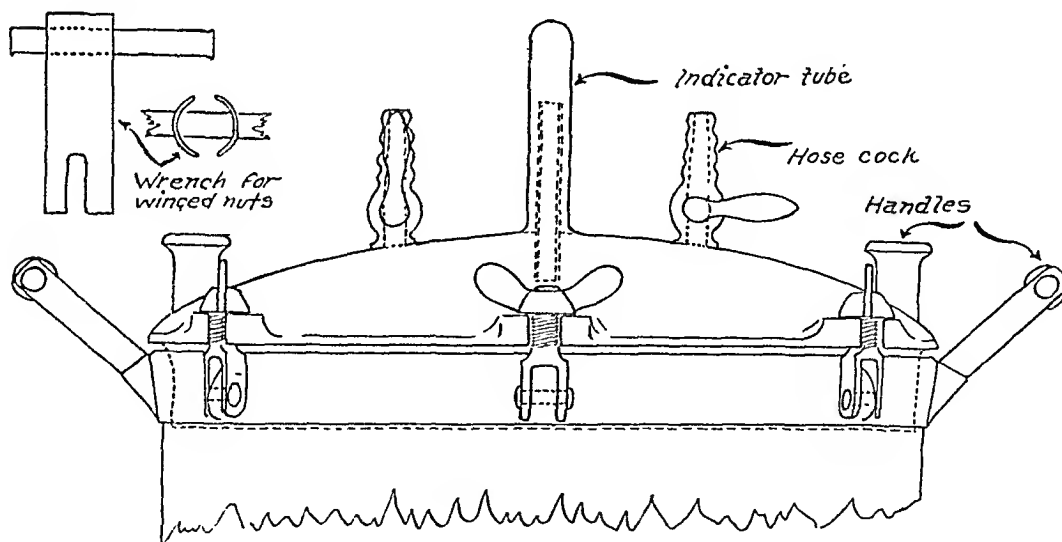
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IN attempting to prepare large quantities of protein fractions from anaerobic bacteria it became necessary to cultivate these organisms on a large scale. The anaerobic jars which are available on the market are usually made of glass and hence breakage is frequent. The phospho-bronze apparatus devised by Wilson¹ is rather small and expensive, the cost being about \$60. For these reasons the jar shown in Figure I was devised. It is made

These cookers are provided with steam-tight fitting lids which are held down by means of several locking bolts supplied with winged nuts and screws, thus making the use of gaskets unnecessary. The retort, or body, is also of pure cast aluminum.

In order to convert these utensils into anaerobic jars, it is necessary to remove the safety or control valve, the steam pressure gauge, and the petcock or release valve. This leaves 3 threaded

FIGURE I. Details of lid of anaerobic jar and special wrench for winged nuts



from a cast aluminum pressure cooker, which is available in convenient sizes ranging from 10 to 25 qt. capacity.*

* This may be purchased from the National Pressure Cooker Company of Eau Claire, Wis., or from any hotel supply house.

openings in the lid. Into 2 of these holes are inserted 2 nickel plated hose cocks (No. 746, $\frac{1}{8}$ " pipe).† A piece

† Manufactured by the Roberts Brass Manufacturing Company, Detroit, Mich.

of 4 mm. glass tubing, extending 2" above and 1" below the surface of the lid, is inserted into the third or central opening. This tube is sealed in place with Metallic-X cement and covered with an inverted 13 mm. test tube which is cut down to 7.5 cm. A redox indicator, such as methylene blue, is poured into the inverted test tube through the tube. The other 2 hose cocks in the lid are also sealed with this cement.

The jar has been found satisfactory when used in the phosphorus method of Varney,² or the hydrogen displacement method of Novy,³ or in conjunction with a central catalyzing station such as that described by Boëz⁴ and Cohen.⁵ Among the anaerobic organisms which have been successfully cultivated in this apparatus are *Bact.*

fusiformis, *Bact. melaninogenicum*, an anaerobic streptococcus, *C. welchii* and *C. perfringens*.

For the sake of economy, flat, 8 oz. bottles (obtained at all pharmacists as containers for "Rub-alcohol") are used in place of Blake bottles, when surface growth on solid media is desired. The total cost of the apparatus made from an 18 qt. pressure cooker does not exceed \$22.

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Midwifery Service of the Victorian Order of Nurses for Canada, 1933

Number of live births, 13,497.

Puerperal deaths,* 25.

Maternal death rate (per 1,000 live births), 1.9.

Rate excluding those where death occurred in hospital, 0.7.

* Includes all cases where Victorian Order has attended during any part of the maternity cycle.

Number who died where Victorian Order supervision was received during pregnancy (2 months), 9.

Death rate among those receiving prenatal supervision, 0.7.

Neonatal rate (per 1,000 live births), 23.3.

Stillbirths (per 1,000 live births), 2.7.

Modern Trends in Public Health Administration County Health Work^{*}

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THE early county health organizations were developed for the purpose of bringing modern public health service to people living in villages and in open country. More recently the importance of the county in the scheme of government has become recognized by students of government and by public officials; consequently the county is being utilized more and more in the administration of many public services; such as, health, education, welfare, and highways for the contained cities of the county, as well as the rural areas.

Many additional influences are tending to bring urban and rural people closer together and to minimize their supposed differences. It is, therefore, no longer correct to separate all people into urban and rural groups or to consider their health problems as being fundamentally different.

Those responsible for arranging this symposium were well aware of these facts, but since other papers deal with health administration from the standpoints of the state health department and the large cities, it was deemed best for me to discuss trends in health administration having a special bearing on problems peculiar to the smaller cities and rural areas and to indicate

how the county is being utilized as a unit of government for the administration of public health service.

TREND IN ORGANIZATION

The earliest official health agency was the board of health. In the eastern and the north-central sections of the United States, these boards were organized on a township basis. County boards were organized in other parts of the country. As a rule, when villages or boroughs attained any considerable size, they chose to administer their health affairs separately, but in a similar manner. The early boards of health were created primarily to control epidemics. Not infrequently the board employed a layman on a part-time basis whose functions for the most part were confined to quarantine, disinfection, and the abatement of nuisances. The southern and western boards appear to have favored the employment of part-time physicians who also rendered medical service to the county poor and to inmates of the county jail and the almshouse. As one might expect, organizations of such primitive types could not be adapted to the needs of the modern public health movement.

In those urban sections where the board of health remained engrossed in its original functions, the newer elements of the public health program were developed by other agencies. The school system soon began to furnish at

^{*} Read before the Health Officers Section of the American Public Health Association at the Sixty-second Annual Meeting in Indianapolis, Ind., October 9, 1933.

least a minimum amount of health supervision for children of school age; programs for maternity or infancy hygiene frequently were sponsored by community nursing organizations; and voluntary agencies often became active in special fields, particularly tuberculosis. For a number of years, these supplementary services were to be found in cities and industrial areas, and little or nothing was being done in farming sections.

The modern public health movement of the rural villages and open country was not of local origin; it came as a result of stimulation and financial aid from outside sources. Among the agencies which took an early and prominent part in promoting the basic administrative organization were the U. S. Public Health Service and The Rockefeller Foundation. The tuberculosis control movement was closely identified with the National Tuberculosis Association. The American Red Cross was a leader in the field of rural public health nursing. The incorporation of infancy and maternity hygiene in local programs can in a large measure be credited to the U. S. Children's Bureau operating under the Maternity and Infancy Act. The Commonwealth Fund and the Milbank Fund followed by demonstrating the need for something more than a skeleton type of organization. These and other health agencies worked through and with the state health departments. A number of the state health departments, notably in the South, set out very early to induce the county authorities to accept some degree of responsibility for administering and financing local health service.

There is some dispute as to the location of the first county health department, but the movement proper appears to have begun almost simultaneously in the States of Washington, North Carolina, and Kentucky, in 1911. It

gradually extended and seems to have reached its high water mark, for the present at least, in 1931, when 616 counties or comparable districts were receiving service which was organized under the direction of a whole-time health officer. Kentucky had the largest number of counties, namely 81, under this type of service. Delaware led in the percentage of rural population under whole-time health service, each of its 3 counties having been provided with a local whole-time health organization by the state. Of the states in which the local governmental units maintained the health organizations, with or without assistance from the state health department or other sources, Maryland, with 95.3 had the highest percentage of rural population under whole-time health service.

The total number of county or district health organizations decreased to 581 at the end of 1932. A large part of this recession can be attributed to the termination of special county-wide organizations created to meet emergencies caused by floods and droughts in the valley of the Mississippi and its tributaries. While the figures for the present calendar year will not be compiled until the close of the year, fragmentary information coming to the Rural Sanitation Office of the Public Health Service indicates that a number of departments are either being discontinued or forced to operate on curtailed budgets, due presumably to adverse economic conditions and to the withdrawal of aid from state and other extra-county sources.

An analysis was made of 532 health organizations which in 1932 were serving 581 counties or comparable units of population. In 29 of these county or district health organizations, the personnel consisted of a health officer only; in 171 counties, 1 health officer and 1 nurse; in 35 counties, 1 health officer and 2 nurses; in 124 counties, 1 health

officer, 1 nurse, and 1 inspector; in 33 counties, 1 health officer, 2 nurses, and 1 inspector. A previous study¹ revealed the annual expenditures of the health departments in a representative group of counties to be \$12,060 per annum, or 37.8 cents per capita. As a rule, counties with larger organizations and expenditures than those reported above were either suburban in character or contained large cities in which the county health department was responsible for the health service. The budgets of rural county health organizations tend to remain on a constant low level. With few exceptions, notable increases are peculiar to the wealthier counties and especially those with a large percentage of urban population.

There now remain approximately 2,500 county or comparable districts in which the local government discharges its responsibility for public health through a part-time county physician or through a lay health officer, working under a township or borough board of health. Perhaps a county or community nurse completes the local organization. Most all state health departments make some attempt to supplement the local organization in such services as vital statistics, laboratory diagnosis, and sanitary engineering. It is also the custom of state health departments to employ a limited number of physicians and nurses who operate on an itinerant basis and attempt to give some measure of assistance in areas without organized local health service. The nature of this supplementary service varies, but more usually it is in relation to the control of local outbreaks of communicable disease.

When the public health movement is viewed over a number of years and for the country as a whole, there is observed an unmistakable trend toward the organization of local health service on the

basis of the county or some comparable unit of population. At times such as the present, there have been recessions of local or national significance. It will usually be found that the losses are sustained in counties of limited resources whose health departments were supported to a great extent by extra-county aid. The most important recent gains have been made in the populous, but more particularly the suburban counties, where consolidations are made in the interest of economy.

Another significant change which also augurs well for the future is the fact that practically all states now make some provision in their administrative structure and budget for the development and stabilization of local health service. The states' influence may be exerted in one or more of several ways; such as, passage of rules and regulations to be observed by local health departments, enumeration of duties to be performed, specification of qualifications for local appointees, or through professional consultation in the several branches of the local service. The system of state subsidy, which is an integral part of most state-wide programs of local health organization, has proved to be a useful device in improving the character of service and in stabilizing the organization.

The amount of local autonomy which obtains varies with the individual states. In some states the local health departments are practically independent units. This is particularly true in those states where the central department is not well organized or where all or a very large part of the funds for the local department are derived from sources within the county. The relationship is quite the reverse in other states, especially where a large part of the funds are derived from state appropriation. Under those circumstances, it is the custom for the state health department to certify applicants for local

appointment, to prescribe the program in considerable detail, and to exercise intimate supervision over the local department in other ways. The trend is toward a larger measure of state control of county health service. One state has already adopted a plan under which all local health service is financed and directed by the state health department, the counties being used only as administrative areas; other states are considering similar legislation. In those states where a central plan of financial support and administrative control is adopted, it is entirely possible that the public health map of the state may be redrafted without regard to county lines, perhaps on the basis of metropolitan districts or natural trade areas.

TREND IN PROGRAM

In some respects, the trend in program quite closely follows the pattern of health organization. The part-time lay health officer seldom does more than quarantine for communicable diseases and investigate conditions in the physical environment which give rise to nuisances. If the health officer is a physician serving on part-time basis, medical care of inmates of the county home and of county prisoners may be added to the duties mentioned above. Even in those communities where no attempt is made to supplement such a rudimentary program, the citizens have not remained beyond the influence of the public health movement. Information on health comes to them by means of the printed page, the radio, and by association with others: the food supply is of better quality than formerly, due to the vigilance of national and state authorities; and they are protected from potential epidemics which are checked at distant sources.

While there is often a decided lag between scientific advances and the incorporation of such measures in the

program of a given local official health agency, the more progressive citizens in the community frequently sponsor the work under other auspices. It is not uncommon to find excellent programs of school hygiene, public health nursing, or other special activities in areas where the local official health agency is very weak. Under those conditions, there is no central directing head and special services are apt to be developed out of proportion to other and perhaps more basic health services.

Where health work is administered by some central agency as a county health department, a better balance of program obtains. An attempt is then made to include the commonly accepted services of health departments, such as those enumerated in the *Appraisal Form for Rural Health Work*. However, by reference to previous statements in this paper concerning prevailing county health organizations and budgets for their support, it will be observed that the average county health department is not equipped to do more than touch the outstanding public health problems in a superficial way. The basic services seldom approach accepted standards of adequacy if the budget is much less than a dollar per capita.

The content of the program of county health departments is influenced some by locality. In the South, a large part of the efforts of the health department is directed against intestinal disorders. In the North, acute communicable diseases, tuberculosis, and various aspects of health supervision receive correspondingly more attention.

There has been no reshaping of program such as has occurred in the larger cities through the elimination of garbage collection and similar services relating to cleanliness. Most county health departments have been organized since health departments were relieved of these responsibilities. Furthermore, these are not problems of rural areas

and not a very serious concern of most villages and small municipalities. In some counties where the health department developed around the county physician, medical care of the indigent is part of the program. Prevailing opinion favors the separation of medical care from the health department, although there is a growing recognition of the unity of preventive and curative services. There is considerable agitation for a transfer of established health department functions to practising physicians. This movement, together with curtailment in budget, has brought about a lessening of the actual service content of the program and now greater reliance is being placed on group and community services. It is difficult to estimate the amount of health service actually being taken over by the practising physician, except under artificial conditions. It seems safe, for the present at least, to make the general statement that the type of public health organization which a community maintains determines the content of the program and the character of the service.

TREND IN THOUGHT

In spite of the many forms of health organization which may still be found in the United States, opinion is becoming crystallized on the principles which should govern the administrative structure. These principles may be expressed briefly as follows:

1. Health service should be localized so that the needs of the people may be understood and that the community resources may be used to best advantage. An administrative district of the state government or a suitable local political unit may be utilized for this purpose.

2. The population of such an area should be of sufficient size to make possible efficient administration and an equitable distribution of costs.

3. The basic health services should

be performed by the official health agency since in this way only can they be given the necessary legal backing and stable basis of financial support.

4. All technical positions should be filled by persons meeting definite professional requirements. The health officer and bureau chiefs should present evidence of successful experience in administrative positions in addition to basic professional education.

5. In those states where public health service is a responsibility of local political subdivisions, the state health department should assume such responsibility as may be consistent with local laws and traditions of government for insuring at least a minimum standard of service throughout the state.

These principles, of course, have not as yet found universal application.

Within recent years there has been a remarkable convergence of opinion regarding the services which should be available in any community whether it be urban or rural. These views were first expressed in the Appraisal Forms developed by the Committee on Administrative Practice of this Association. Subsequent revisions of these forms reflect the further evolution of the earlier concepts.

DISSENTING OPINIONS

Perhaps I have given the impression that all public health workers are of one mind and that the product of our labor meets with universal approbation. I have been attempting to depict only predominating movements. There are also well defined movements which go contrary to the main trend. It would be most unjust to many sound and original thinkers if I should fail to give expression to the views of the dissenters within our ranks and to the criticisms of outsiders. Many of these variants deserve careful study, but in this paper it is possible to express only opposing views on a few fundamental issues.

Broadly speaking, the services discharged by organized society for the conservation of health fall into three classes: sanitation, health supervision, and care of the sick. Health departments as a rule have not accepted responsibility for organized care of the sick, except certain communicable diseases. Gradually departments are lessening the amount of personal service in relation to sanitation and health supervision, and instead are relying more and more on education and regulation. A number of county health officers fear that if this course is pursued, it will lead to a rather sterile type of program which will not be sufficiently broad in its appeal to insure permanent support of the health department from public funds. Furthermore, the necessary auxiliary facilities are not available in many counties to complete the service to the individual if the health department confines itself only to making recommendations. It is entirely possible, as some think, that county health departments would be more certain of local support if programs were designed with greater regard for those desires which spontaneously arise in the minds of the people.

In the general field of public administration, there is a pronounced tendency toward making all public services accountable to elected officials either directly or through division heads appointed by the elected officials. Under this scheme, boards are being abolished or if retained, their rôle becomes purely advisory. While this is contrary to our old theories that health must be isolated from general government, it must be admitted that the plan is working successfully in some places, especially where professional standards and security of tenure are insured through an established personnel policy applicable to the government as a whole.

Another tendency in public adminis-

tration is that of grouping related services into a limited number of primary units of government. Many students of the subject see at least two attributes common to sanitation, health supervision and care of the sick: (1) the services are designed for the conservation of health, and (2) persons are prepared for performing these services through training in the biological sciences. They feel that the community would be served more effectively and economically if these related services were combined under unified direction. Opposing views are held by those who believe that the health department should be only a planning and coördinating agency and that others should perform the actual services which the health department recommends.

During the past quarter of a century, in particular, there has been a remarkable reduction in the so-called preventable diseases and an increase in the span of life. The present generation seems to enjoy a higher level of health than did its forebears. These favorable trends no doubt have resulted from a variety of causes, many of which we fail even to comprehend. Public health workers are sometimes accused of being prone to take exclusive credit for these favorable trends. I do not consider this criticism just; on the contrary, if we have erred, it is on the side of modesty in presenting our claims. Nevertheless, these charges should not be brushed aside too lightly since it is not always possible to relate many of our alleged accomplishments to specific preventive measures. In this connection, it is gratifying to record an awakening interest in the subject of health administration. Methods of scientific research are now being applied to various aspects of this difficult art. Until recently we were forced to rely on the experience of individual health officers. The Committee on Administrative Practice of

this Association has attempted to pool these experiences and, through the use of group judgment, to establish standards of practice. It is necessary now to go a step farther and determine in a more exact way the effectiveness and economy of each procedure which enters into the public health program and, where necessary, to devise methods better suited to the needs and resources of the people.

SUMMARY

The desirability of localizing public health service is recognized, but the per capita cost becomes excessive unless it can be distributed over a population unit of considerable size. Most counties have sufficient population and wealth to insure a stable basis of financial support at reasonable cost to the individual. The county, because of being a unit of government, can also give the necessary legal authority to the health officer.

The services comprising a modern public health program cannot be discharged satisfactorily by a part-time physician or lay health officer working alone. An unbalanced and expensive type of program frequently obtains where supplementary services are performed under separate auspices. More and more counties or comparable districts are consolidating all public health services within the area into a single

department under the direction of a full-time health officer especially trained in public health procedures.

Prevailing budgets are below 50 cents per capita, but experience has demonstrated the need of one dollar or more per capita.

Up to the present time, health departments have been concerned primarily with the prevention of disease. Education and regulation are the principal instruments used in the approach. It is now being recognized that preventive and curative measures are closely related and that each scientific advance necessitates a larger amount of personal service in administrative practice. Health departments as a rule do not favor entering curative fields or increasing the personal service content of existing programs. On the other hand, a number of persons concerned with public administration as a whole take the view that the community might profit if the health department were given administrative and budgetary responsibility for those governmental services which are designed to promote or restore health since they are equipped to do so because of training and community contact.

REFERENCE

1. *A Study of Rural Health Service*, Commonwealth Fund, New York, 1933.

Mirror Manufacturing

AFTER briefly discussing the history and foreign experience with the manufacturing of mirrors, the extent and scope of the industry in the United States and Canada are given, followed by an analysis of the conditions in two typical plants. The different processes

of manufacture are briefly discussed as well as the potential health hazards, and the usual classification and index of jobs, which characterize this series of reports. —Retail Credit Company, Atlanta, Georgia, *Industry Report*, 9, 5:45-52 (May), 1934.

The Use of Laymen in Official Public Health Nursing Programs*

STATE

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THE National Organization for Public Health Nursing compiled a census of Public Health Nursing in the United States for 1931, which was published in 1932. I have not succeeded in securing any statistics of more recent date, though I am convinced that these are no longer applicable in many states, because of the reduction in public health budgets and staffs.

The report stated that—"State practices are so variable that it is difficult to discuss any general principles or programs in regard to the status, administration and functioning of public health nursing. Some state departments carry on local health work, and other states maintain an advisory or consultant nursing service. Public health nursing service is an activity of the state health department in 42 states: there are 8 states which have a separate bureau of public health nursing; 12 states in which public health nursing is combined with another activity to form a separate bureau; and 22 states where public health nursing is an activity carried by one of the various divisions of the state health department."

Tennessee belongs in the last named

group of 22 states—and the public health nursing activity is listed under "Central Administration" as a service to county and other local health work. It is really a decentralized service, with one state director directly concerned with supervision in an administrative capacity. It is not, however, an administration of the local services. It is essentially a technical supervisory service. The other state public health nurses serve full-time in the field. The state staff, including the nurses in the tuberculosis control program, has been cut from 16, when the census was taken, to 5. In addition, there are 72 nurses on the staff of 37 full-time county health units and districts, serving more than 40 out of 95 counties, and about 52 per cent of the state's rural population. The nursing staffs of the cities are not included in these figures, nor in this discussion. The public health nursing service, with a few exceptions such as industrial insurance, school, tuberculosis, and Red Cross nursing, is an integral part of the city, county, and state programs of public health.

It is difficult to say that lay groups cooperate with the state public health nursing work, as differentiated from other services of the public health program. In cooperating with the nursing activity, they may be working in the maternity and infancy program, with preschool or school health clinics, in

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the tuberculosis control program, or improving the vital statistics service.

In the southern states, much of the social order is still rural and agricultural and the organization is simple rather than of the complex type found in more highly industrialized communities. We have fewer or smaller problems of industrialism and immigration. But if we have a less complex civilization, we have serious and stubborn conditions with which to struggle. In most of the southern states we have too many, too small and too poor counties; a dual system of education; a high rate of illiteracy; high tax rates, producing small incomes; isolated, sparsely settled, often inaccessible communities; fewer physicians and inadequate hospital facilities.

We have, in Tennessee, rural counties where the only organized groups are the churches and the schools. We have counties with fewer than 5,000 people, where it is impossible to support adequate school systems and public health service.

Necessarily many statements made in this paper have little bearing on conditions in such states as New York, New Jersey, Pennsylvania, Illinois, Ohio, or California, but, after all, turn about is fair play. After a long apprenticeship spent at national conferences, congresses, councils and conventions, during which I suffered in silence while 95 per cent of the time was given to a discussion of the problems of New York, Chicago, Philadelphia, and other large cities, I can sympathize with you as you are forced to listen to this voice from the wilderness—from the real hinterland.

Because our programs of public welfare and social work are of more recent development, we have collected few barnacles on our organization, beyond those due to causes already mentioned. If we have no less violent opposition to progressive measures, it comes from a

homogeneous population. We have the opposition of plain ignorance, prejudice, and superstition. But it is not colored by the additional complications of heterogeneity as evidenced by differences in language, religion, modes, and customs. On the same economic levels, you will find the whites and negroes amazingly alike in habits and attitudes. We may not speak the speech trippingly, but even a social worker from Boston can make a lucky guess at a Tennessee mountaineer's meaning. And today we have an almost universal language of unemployment, of poverty, of human need.

It will be generations before our rural states can maintain adequate nursing service without outside help from the federal government.

In 1931, the total number of public health nurses in the United States was 15,865—an average of 1 nurse to almost 8,000 people, but very unequally distributed. The National Organization for Public Health Nursing tells us that if we desire adequate service we should have 1 nurse to 2,000 people. On that basis, no state has yet reached a satisfactory standard. In 1931, Connecticut had the best record—an average of 1 nurse to 3,000. Massachusetts had 1 to 3,675, New Jersey, 1 to 4,000, New York, 1 to 4,700, Pennsylvania, 1 to 6,424. Ohio's figures were 1 to 6,082, Michigan, 1 to 5,400, Illinois, 1 to 8,000, Iowa, 1 to 12,900, Nebraska and Kansas, 1 to 14,000—North and South Dakota, 1 to 27,000 people. California's record is the best in the Far West, 1 to 6,500. Coming south, we find in Maryland 1 nurse to 6,150; Virginia, 1 to 10,400; Tennessee, 1 to 12,450; with an increase in Kentucky, Florida, North Carolina, Georgia, South Carolina, Alabama, Arkansas, Oklahoma, until we reach the climax in Mississippi, where we find 1 public health nurse to 51,550 people.

To the scarcity of public health

nurses we must add other factors already discussed: a widely scattered, often inaccessible rural population. Many times the neediest groups live far from any beaten path, in coves or valleys or on the steep mountain sides. We may find in these communities a high maternal and infant mortality rate, much tuberculosis, trachoma, pellagra, typhoid fever, with malaria down in the lowlands, and other diseases due to ignorance, poverty, malnutrition and lack of sanitation.

The Tennessee Department of Public Health is under no delusions as to the size and importance of its task. The Commissioner, Dr. E. L. Bishop, and his staff have moved forward as rapidly as it has been possible to develop informed local support and cooperation. A systematic effort has been made to carry a balanced program without undue emphasis on any one phase of public health service. The pattern followed is that of the full-time county health unit, with a minimum personnel of 3 trained workers and a clerk. Cooperation of counties is voluntary (there is no mandatory legislation compelling the establishment of whole-time health services). The unit of government is the county, governed by the county court of magistrates.

From the beginning of the present public health program, in 1924, there has been a steady campaign to interest the voluntary agencies, and to secure their support and cooperation in stabilizing and extending the services of the department. In 1926, the State Federation of Women's Clubs established a policy of active cooperation in the campaign to place Tennessee in the birth registration area. In many places, club women made a thorough house-to-house canvass. In 1932, the State Legion Auxiliary and State Congress of Parents and Teachers gave valuable help in rechecking the census figures on birth registrations.

These incidents do not bear directly on public health nursing, but indicate the use of the voluntary agency in the interpretation of health facts and in the exchange of information. The voluntary organization serves as a voice for the people most concerned, and helps in the integration of public and private agencies. It supplements the service of the official agency and makes possible more effective, better coordinated machinery.

Several years ago, one of my friends, a distinguished public health nurse, went to one of the large eastern industrial centers, to organize a public health nursing council. In that city, there were more than 70 agencies with independent programs, employing public health nurses. Situations such as this do not obtain with us because of two causes: lack of funds, and lack of old established programs of social work. Our main difficulty is often the reverse of such conditions. There may be no organization to provide a channel of education and interpretation.

You have heard from previous speakers that public health nurses may serve under local boards of health and boards of education, and under official agencies, semi-official or private groups—tuberculosis associations, Red Cross, insurance companies, industrial or commercial concerns, or social settlements and other welfare agencies. In many places, these agencies have a central council to prevent overlapping and duplication. In the counties, we may find more independence of action, more duplication and wasted effort, less unification of program and objectives. We see instances where national boards or agencies, in a desperate search for a program to provide a basis for financial appeal, insist on independent action. This is done in order that it may receive greater publicity, keep its prestige, and maintain a large organization for the raising of money. The funds secured

are often spent on unnecessary or insignificant causes—when through co-operation with the official and other voluntary agencies they might be of great constructive value.

We find fewer conflicts in the field of state organizations because many of the agencies, with nursing service, have only local connections. Several state-wide lay organizations have definite policies of coöperation with the state and local departments of public health. The state organization of the D. A. R. undertook the partial support of the first public health nurse in a mountain county, and continued this project through the State Department of Public Health until the county was ready to take over its part of the support of the entire health unit. The State Federation of Women's Clubs has contributed for several years in the same manner to the salary of a public health nurse who works in a district composed of two counties. The Federation is just entering upon a second similar project in a very backward county. The counties are chosen by the State Department and the coöperating agency because of their health needs, and their financial condition. The nurses are selected by the State Department of Public Health. Reports are sent quarterly to the co-operating agency, and are made by the nurse in person at annual conventions. In addition, the State Federation of Women's Clubs, the State Congress of Parents and Teachers, the State Federation of Business and Professional Women's Clubs, the State Legion Auxiliary, and the W.C.T.U. have, among their definite objectives, co-operation with the State Health Department in securing full-time public health service for all the people of the state.

Some of these state organizations have printed programs on the organization, policies and services of the state and local health departments.

Local, county, and district groups coöperate in various health projects, such as Summer Round Ups, Blue Ribbon Program, Well Baby Clinics, and in the organization of local health committees and county health councils. All of this work is direct coöperation with the public health nurses. Local health committees help with clinics, with supplies, transportation, publicity, education, and financial support. State organizations coöperate in the state legislative program. Most effective work has been done in the program of legislation for the State Department of Public Health by the above mentioned groups.

One of the most successful efforts in state-wide coöperation was the Tennessee Conference on Child Health and Protection, held in November, 1932. The findings of that conference have gone back to the organized county groups to be translated into action, thus bringing into a community of thought the problems of child health, education, training and welfare, with the economic background necessary for their understanding and solution. The worth of county-wide health councils has been clearly demonstrated in Tennessee. They have proved the value of continuous volunteer service as an integral part of a program of public health. They serve as case finding media, they help to overcome the diffusion in rural health work, and have a long record of achievement in the correction of defects, in securing immunization, in the field of investigation, and in educating the public to the necessity of financial support for a growing program. Local health committees are a necessity in districts where the nurse serves a large county-wide unit of population. State organizations in Tennessee urge their local groups to participate in the ever-widening field of community coöperation.

I have a letter from one of the chair-

gation conducted in 1926 when precipitation tests made by Dr. Kahn were included was of particular significance since a comparative evaluation of the methods widely used in North America and those represented in the conferences held under the auspices of the League of Nations at Copenhagen and Montevideo was thus made possible.

Finally, the progress reports include the comparative series of tests made in laboratories operating in the State of New York under supervision and approval. The results provide a convincing demonstration of the importance of the adoption of methods which, although they may differ somewhat in detail, are sound in principle and so carefully adjusted as to provide a guard against reactions with non-syphilitic sera that may occur in oversensitive tests. In the comparative tests of this series, reactions were seldom obtained by any of the methods included in the study with specimens from patients free from history or evidence of syphilis. In two laboratories where identical methods were used, differences of negligible degree only occurred. Thus, for purposes of a standard method all the data available indicate the desirability of specifying the elements of technic essential for accuracy and omitting details which have not been proved to be necessary. The proposed method was submitted to serologists in Canada and the United States for their opinions of its value and received most favorable consideration.

GENERAL REQUIREMENTS

I. *Qualifications of personnel*

An individual who is familiar with the clinical manifestations of syphilis, and who has had thorough training in serology, pathology, and bacteriology, should be directly in charge of the work. As an alternative, a consultant, who is familiar with the clinical mani-

festations of syphilis, should be available to evaluate the findings.

II. *Minimum number of examinations*

The test should, in so far as possible, be performed in laboratories examining relatively large numbers of specimens, not only for purposes of economy, but for the greater reliability of results. It is desirable that the minimum number of examinations should be 50 per week, and that the test should be made at least twice weekly.

III. *Provision of standardized reagents*

The provision of antigens and amboceptor should be undertaken by central laboratories having adequate facilities for their standardization. Such laboratories should also arrange to furnish, for purposes of control, syphilitic sera which give reactions of known strength.

IV. *Nature and condition of specimen*

A. The specimen should consist of blood or spinal fluid, as free as practicable from contamination. Hemolyzed specimens of blood or spinal fluid showing evidence of bacterial growth should not be considered satisfactory for examination.

B. Each specimen should be accompanied by sufficient history for purposes of identification and for the evaluation of the results of the test.

V. *Identification of specimens, records, and reports of examinations*

A. Each specimen should be given a serial number as soon as opened in the laboratory.

B. Complete records of all examinations should be filed permanently.

C. A signed, written or typed report of the result of the examination should always be sent to the physician.

VI. *Equipment*

A. Glassware:

1. All glassware should be chemically clean.

2. Only graduated pipettes (or automatic pipettes regulated to deliver measured quantities) should be used for measurement of the various constituents of the test other than salt solution.

3. A separate pipette should be used for each specimen and for each reagent.

4. The tubes for the test should be of such size that the reagents can be readily mixed.

B. Water bath:

The baths should be so constructed as to maintain in every part the temperature required for inactivation or for incubation.

C. Refrigerator:

The refrigerator should be such as to maintain in every part used the temperature required for fixation.

TECHNICAL REQUIREMENTS

I. *Preparation and standardization of constituents*

The diluent for all reagents should be a salt solution containing chemically pure components isotonic for red blood cells.

A. Patient's serum and spinal fluid:

1. Preparation—

Serum should be freed from blood cells and inactivated by heating in a water bath at 55° C. (The period of inactivation should be constant and should not be more than $\frac{1}{2}$ hour nor less than 15 minutes.) The natural antisheep amboceptor should be absorbed, if present in sufficient quantity to affect the sensitivity of the test. Spinal fluid should be freed from cells or sediment, and if it contains blood, should be inactivated in the same manner as blood serum.

2. Quantities to be tested—

The largest quantity of serum tested should be at least the equivalent of that used by Wassermann, 0.2 c.c. (the total volume of the test being 5 c.c.),

and preferably 2 or 3 times this amount; the largest quantity of spinal fluid tested should be from 5 to 10 times the volume of serum employed. At least one-half the largest amount of serum or spinal fluid should also be tested to detect so-called prezone reactions.

B. Antigen:

1. Number and kinds of antigens—

Lipoidal extracts of normal heart muscle, preferably beef heart, furnish a satisfactory base. At least one of the antigens used should be reinforced with cholesterol. Tests with two antigens or another generally accepted serologic test (precipitation or flocculation) for syphilis should be performed for purposes of confirmation.

2. Standardization—

Antigen should be accurately titrated for lytic, anticomplementary, and antigenic properties. Only antigens with a wide range between the dilution in which they react with syphilitic sera and that in which they are anticomplementary, in which they give fixation with specimens from normal persons, or in which they are hemolytic, should be used.

C. Complement:

1. Preparation—

The serum for complement should be obtained from healthy guinea pigs, preferably males. The individual sera should be tested for hemolytic activity, both with and without addition of amboceptor, for fixability in the presence of syphilitic sera and antigen, and for failure to react appreciably with antigen alone. Only those found to be satisfactory should be included in the pool of sera from three or more guinea pigs. The complement serum, after withdrawal from the clot, should be kept undiluted at a temperature of from 0 to 6° C. until used, and should not be more than 48 hours old when the hemolytic system is added to the tests.

2. Titration—

The hemolytic value of the complement should be determined each day not more than a few hours before the tests are made. The same red blood cells and hemolytic amboceptor should be used for both. Complement varying widely from the average in quality should be discarded. The amount of complement used in the test should represent a slight excess over the minimum required for complete hemolysis in the presence of non-syphilitic serum and antigen as determined by repeated quantitative experiments with the antigens and method of fixation employed.

D. Suspension of sheep's red blood cells*:

The blood should be collected aseptically. The blood cells should be freed from serum by at least three "washings," not less than 10 volumes of salt solution being used to each volume of cells, and after the final washing, the supernatant fluid should show no appreciable hemolysis. The suspension should contain a definite proportion of packed cells by volume and should be prepared in such a way as to be of practically constant density.

E. Antisheep hemolytic amboceptor:

1. Preparation—

The amboceptor—antisheep hemolytic serum—should be produced by immunization of an animal and should be markedly hemolytic and practically free from agglutinative properties in the dilutions used. Fluid serum rather than serum dried on paper should be used. This should be inactivated and stored in sterile ampules or preserved by the addition of an equal volume of T. P. glycerol.

2. Titration—

The hemolytic value of the ambo-

ceptor in terms of the standard amount of red blood cells should be determined accurately by titration with different specimens of complement. The amboceptor should have no demonstrable agglutinating effect in the dilution used. The amboceptor should be added in the same manner to complement-fixation tests and to titrations of complement or antigen, either combined with the red blood cells or separately. The period of incubation, also, should be the same for titrations of complement and amboceptor.

II. *Method of conducting the complement-fixation test*

A. Combining the constituents:

After the serum or spinal fluid, antigen, and complement have been combined, the volume in all tubes should be equalized by the addition of a sufficient amount of salt solution and the racks shaken to mix their contents thoroughly.

B. Temperature and period of fixation:

A prolonged period of fixation at a low temperature is essential. At least 4 hours at from 0 to 6° C. are required and an additional exposure of from 10 to 15 minutes in the water bath at 37° C. is desirable. Otherwise, provision should be made for an additional test with incubation at 37° C. for from ½ to 1 hour in case the history indicates the possibility of recently acquired syphilis.

C. Period of secondary incubation:

The period of secondary incubation, i.e., the incubation at 37° C. following the addition of the hemolytic system, should approximate that used for the titrations of complement and amboceptor.

III. *Controls*

The following controls should always be included:

A. A test of each blood serum and

*An antisheep hemolytic system is specified because normal sheep blood can usually be obtained easily in large quantities and antisheep hemolysin of high titer is easily produced.

each spinal fluid without antigen as a control upon anticomplementary properties.

B. Tests of each antigen without serum in the same and in at least 4 times the amount used in the tests.

C. A test of each antigen with a syphilitic serum previously found to give complete fixation and also with one found to give only partial fixation.

IV. *Reading and recording of results*

A. Inspection of controls:

At the time that the readings are made, the anticomplementary controls of each serum and spinal fluid and the controls of the antigens used in the tests should be completely hemolyzed. The control tests with syphilitic sera should show no hemolysis and partial hemolysis respectively.

B. Reading and recording reactions:

The degree of complement-fixation should be estimated from the proportion of unhemolyzed blood cells in each tube, preferably by comparison with standards containing known proportions of hemolyzed and unhemolyzed cells. The result of the test should be recorded without reference to the clinical history. When the reactions with the different antigens disagree, or the results of the complement-fixation test do not correspond with those of the other serologic

test for syphilis used, or when there is any evidence of technical inaccuracy, the findings should be verified by repetition of the tests. Further confirmation may be considered necessary when reactions occur that are unexpected in view of the history submitted. The results of the complement-fixation test for syphilis should always be evaluated with reference to the clinical manifestations.

A. WADSWORTH, *Chairman*

N. MACL. HARRIS, *Secretary*

RUTH GILBERT, *Referee*

*Committee on Standard Methods
of the Laboratory Section of
the American Public Health
Association, 1933*

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Place Variation in the Death Rates from Puerperal Septicemia*

Large Cities of the United States, 1922-1929

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IT is well known that during recent years the death rates from puerperal septicemia have shown no tendency to decline. The conclusion might be drawn from this fact that either no measures of control have been employed or that those which have been used are of no value. If, however, there is a possibility of reducing the rates, then, in case the first explanation holds, an incentive is supplied for attempting to institute proper measures and for changing to better ones if the second explanation holds. If, on the other hand, reduction of the rates is impossible under present conditions, then an excuse is at hand for the recorded failure.

What, then, is the possibility of reducing the death rates from puerperal septicemia? Some statistical information was sought upon this question by studying the variation from place to place exhibited by the death rates from puerperal septicemia for large cities with the idea in mind that if the observed variation exceeded that which might be ascribed to chance, then reduction in the rates under present conditions would seem to be a possibility.

There are 55 cities in the United States, each of which had a population of 100,000 or more in 1920, and each of which was continuously in both the birth and death registration areas from 1922 to 1929. For each of these cities for every year of the period the total births (the sum of the live births and the stillbirths) were obtained from "Birth, Stillbirth, and Infant Mortality Statistics,"¹ and the deaths due to puerperal septicemia from "Mortality Statistics."² For each year of the period death rates from puerperal septicemia per 1,000 total births were calculated for each city. There were thus 8 yearly series of rates.

In studying the place variation exhibited by these series of rates it was apparent that methods must be used which would make due allowance for differences in size of city. This was accomplished by calculating the weighted mean and the weighted standard deviation for each series of rates. In obtaining these constants each city was weighted according to its size measured in total births. A weighted theoretical standard deviation was calculated for each series upon the supposition that each series was distributed according to the binomial law. The Lexian ratio for each series was also obtained by merely dividing the

*Read before the Vital Statistics Section of the American Public Health Association at the Sixty-second Annual Meeting in Indianapolis, Ind., October 12, 1931.

TABLE I

PUERPERAL SEPTICEMIA: SUMMARIZED DATA AND STATISTICAL CONSTANTS FOR
55 LARGE CITIES OF THE UNITED STATES, 1922-1929

Year	Sum of Total Births	Sum of Deaths from Puerperal Septicemia	Weighted Mean Rate per 1,000 Total Births	Weighted Standard Deviation	Weighted Theoretical Standard Deviation	Lexian Ratio
1	2	3	4	5	6	7
1922	582,817	1,519	2.61	0.800	0.496	1.61
1923	595,547	1,654	2.78	0.944	0.506	1.87
1924	612,571	1,656	2.70	0.894	0.492	1.82
1925	599,608	1,644	2.74	0.872	0.501	1.74
1926	590,180	1,553	2.63	0.947	0.494	1.92
1927	593,741	1,620	2.73	0.900	0.522	1.72
1928	578,930	1,550	2.68	0.836	0.504	1.66
1929	567,341	1,495	2.64	0.838	0.505	1.66
Total	4,720,735	12,691				

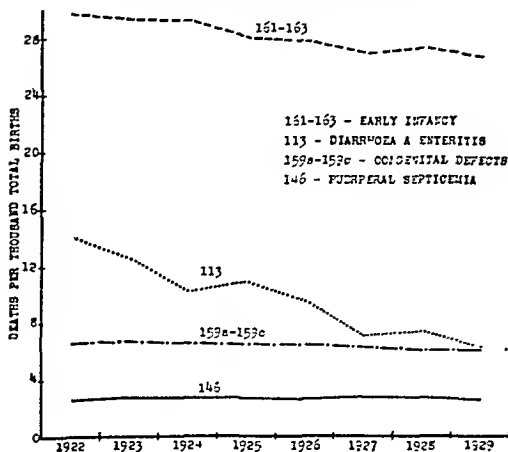
actual weighted standard deviation by the weighted theoretical standard deviation.

The results obtained are brought together in Table I. It will be seen that column 4 justifies the statement made at the beginning that the rates from puerperal septicemia have remained practically stationary during recent

years. It is also evident from columns 5 and 7 that the amount of variation in the rates, whether judged by the weighted standard deviation or the Lexian ratio, has remained about the same throughout the period. Furthermore, the Lexian ratios are always greater than one, indicating that for each year the amount of variation actually exhibited by the rates exceeds that which might be ascribed to chance.

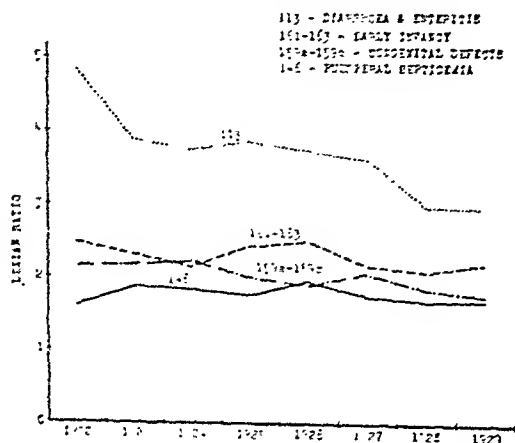
A similar table for comparative purposes was prepared for each of the following causes of death: diarrhea and enteritis under 1 year of age, congenital defects under 1 year of age, and early infancy. The more important results are presented in Figures I and II. The weighted mean rates (Figure I) for early infancy show a slight decline, and those for diarrhea and enteritis a marked decline. The rates for the other two causes have remained stationary. The Lexian ratios (Figure II) throughout the period are larger for

FIG. I. WEIGHTED MEAN DEATH RATES FOR CERTAIN SPECIFIED CAUSES. 55 LARGE CITIES OF THE UNITED STATES. 1922-1929.



diarrhea and enteritis than for either of the other diseases, puerperal septicemia having the smallest Lexian ratios.

FIG. 11. LEXIAN RATIOS FOR CERTAIN SPECIFIED CAUSES, 100 LARGEST CITIES OF THE UNITED STATES, 1922-1929.



Furthermore, the Lexian ratios are greater than one. It is of interest to note that as the rates from diarrhea and enteritis have declined the corresponding Lexian ratios have declined also, evidence that the greater the control of a disease the less will be the place variation exhibited by its rates. If the amount of place variation exhibited by rates is at all indicative of the possibility of their control, one is forced to the conclusion from a study of Figure 11 that there is much less possibility of further controlling puerperal septicemia than of controlling diarrhea and enteritis. In a rough way, it would seem that puerperal septicemia, congenital defects and early infancy constitute a group of diseases with about equal possibilities of further control.

The data for the cities were next analyzed in the following manner: the 8 series were combined into one, thus a description of the experience of 440 cities for an interval of 1 year was obtained. This somewhat artificial point of view is justified by the fact that judged by the constancy of the observed rates and the smallness of their variation, the factors affecting the incidence of puerperal septicemia must have re-

mained approximately the same from year to year.

If, now, for such a series of cities, p equals the chance of dying, $(1-p)$ or q equals the chance of not dying, s equals the base upon which rates for the cities are calculated, and m equals the mean size of city, then, as has been shown by Fisher,³ the weighted theoretical standard deviation is equal to

$$\sqrt{\frac{s^2 p q}{m}}$$

If s be taken equal to m , then the formula becomes $\sqrt{m p q}$, the standard deviation of the binomial $(p + q)^m$.

The mean size of city was found to be $\frac{4,720,735}{440}$, or 10,729 total births. A death rate for each city was calculated

TABLE II
DISTRIBUTIONS OF 440 CITIES CLASSIFIED
ACCORDING TO THE NUMBER OF DEATHS
FROM PUERPERAL SEPTICEMIA PER
MEAN NUMBER OF TOTAL BIRTHS

Mean Number of Total Births. (10,729)	Combined Yearly Distri- butions	Theoretical Distribution
Under 5	4	(Under 10) 0.1 0.7 6.6 39.1 110.5
5 to 10	6	
10 " 15	16	
15 " 20	40	
20 " 25	72	
25 " 30	75	(Over 45) 4.6 150.1 97.7 30.6
30 " 35	78	
35 " 40	46	
40 " 45	39	
45 " 50	23	
50 " 55	10	
55 " 60	14	
60 " 65	8	
65 " 70	6	
70 " 75	1	
75 " 80	0	
80 " 85	2	
Total	440	440.0
Mean	32.079	32.079
Standard Deviation	13.130	5.655
Lexian Ratio	2.32	

using this figure as a base. The distribution of these rates appears in Table II alongside the distribution which would have been expected if chance alone were the controlling factor in a universe in which the chance of dying is 0.00299. This latter distribution represents the expansion of the binomial $(q + p)^m$ in which $p = \frac{32.1}{10,729}$, or 0.00299; $q = 1 - 0.00299$, or 0.99701, and $m = 10,729$. Since for the binomial $(0.99701 + 0.00299)^{10,729}$, $B_1 = 0.031$ and $B_2 = 3.031$, its expansion was approximated by using the normal curve.

The chi-square test was carried out on these distributions and the value obtained (5,208) is so large that there is practically no likelihood that the actual distribution could be a random sample from a population of cities in which the probability of dying from puerperal septicemia is 0.00299. In other words, the actual distribution is dependent upon other factors than chance.

A comparison of the two distributions

reveals the fact that more cities have low rates and more cities have high rates than would be expected on the basis of chance alone. This situation is favorable for a further reduction in the mean rate for all the cities because the hope would seem to be justified that the conditions favorable to low rates, experienced by some cities, might be determined and be duplicated in the cities with high rates.

These two methods of statistical analysis of the data available for large cities of the United States justify the hope that the reduction of the present high death rates from puerperal septicemia is a possibility.

NOTE: The author wishes to acknowledge his indebtedness to Miss Huldah Bancroft for assistance in making arithmetical calculations and in drawing up the tables and graphs.

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Purification of Vaccinia Virus*

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THE success attained by chemists in preparing purified or concentrated extracts of tissue containing enzymes and other biological products has stimulated similar attempts upon the tissues of animals infected with filterable viruses.^{1, 2, 3} The virus of vaccinia has received considerable attention in this respect, due in part perhaps to the economy and facility of laboratory manipulations and to the accessibility of applying practically, some of the observations made. Thus, in the last few years, many investigators have reported on adsorption,^{4, 5} purification,^{6, 7, 8} and filtration^{9, 10, 11} experiments with vaccinia virus.

We wish to report a number of observations which after further investigation should lead toward a highly purified and readily filterable vaccinia virus. In order to give a clear understanding of the reasons for our steps it is necessary to describe the actual sequence of our experiments.

An attempt was made to determine the duration of survival of vaccinia virus in milk. The Levaditi neuro-strain, maintained by testicular passage in rabbits, was employed. Two series of flasks were set up as follows:

1. A series containing 75 c.c. of whole defatted pasteurized milk and 25 c.c. of a third generation tissue culture of vaccinia virus in Maitland's medium

2. A series containing 99 c.c. of whole de-

fatted pasteurized milk and 1 c.c. of a 1 per cent emulsion of a glycerinated vaccine testicle

The milk was titrated and tested on the skin of rabbits at intervals and at the end of 183 days the virus in both series still retained its original potency. No tests were made between the 6th and 11th months. By the 11th month the virus had diminished in nearly all of the samples. These samples, however, were found to be highly contaminated with bacteria, so that it is possible that the virus might have survived for a longer period.

The testicle of a rabbit which had reacted weakly was sliced longitudinally, one half stored in 50 per cent glycerine, the other in milk and both kept in the refrigerator. At the end of 4 weeks the glycerinated testicle was entirely devoid of virus while the half preserved in milk still gave an appreciable reaction on rabbit skin in a dilution of 1-5,000. The survival of the virus in milk might possibly be explained on the basis of protective colloidal action, as is indicated by observations which followed.

Shortly after setting up the aforementioned series of flasks containing virus and milk, one of the samples which had been left out of the refrigerator turned sour due to bacterial contamination. Both the precipitated casein and whey were tested for presence of the virus. Nearly all of the virus was adsorbed on the casein, while the whey contained a little of the virus, which, however, filtered through a Berkefeld V

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candle without loss. Fresh samples of virus ground in milk, when precipitated with acetic acid, behaved in a similar manner. It was also possible to adsorb the virus on precipitated, washed, and acidified casein directly from emulsion made in saline solution and release it from the casein, by washing with dilute alkaline solutions.

Employing a purified casein (Harris) as adsorbent it was found that good adsorption takes place at pH 4.9–5.5, and that the virus is released when the pH is shifted above or below 4.6, the iso-electric point of casein. The optimum, however, was found to be between pH 7.6 and 8.5.

Although potent yields of virus can be obtained by this method it is not entirely satisfactory since the resulting solutions contain casein and the virus is completely lost on filtration.

Comparative studies with other adsorbents such as kaolin, silica gel and aluminum hydroxide (Type C, Willstaetter) showed that each of these gels adsorbed well. Elution, however, was difficult, giving poor yields of virus at best. Filtration experiments with the best of these eluates were negative. This difficulty was also encountered by Parker and Muckenfuss¹² who attempted to purify vaccinia virus for complement fixation studies. The combination of alumina gel with casein resulted in an eluate which contained the highest yield of virus which passed through both the Berkefeld and Seitz filters. The following procedure was used:

An amount of a 5 per cent suspension of purified casein in distilled water is added to an equal amount of aluminum hydroxide (standardized to contain approximately 22.5 grams of aluminum oxide per liter). The mixture is adjusted to pH 4.9–5.5 with KH_2PO_4 . To a volume of this mixture is added an equal volume of a 5 per cent emulsion of either fresh or glycerinated vaccine testicle in physiological saline solution. These are kept in contact from 2 to 4 hours, then centrifuged, the precipitate washed with

distilled water, and the volume of liquid replaced with equal volume of basic solution. The pH of the mixture is adjusted to about pH 8.2–8.5. In from 2 to 4 hours the supernatant is removed containing a potent virus which filters consistently through the Seitz without loss in potency and through both the Berkefeld V and N with only slight loss.

The ease with which filtration is accomplished by this method may be comparable to the filtration of the whey of precipitated milk-virus mixture.

In this work we confirmed the observation of previous investigators as to the rapid deterioration of vaccinia virus in saline emulsion. Adsorbed virus, on the other hand, retains its original activity for several days at least.

In attempting to repeat the work of Behrens and Morgan⁸ on purification by iso-electric precipitation, using testicular emulsions instead of brain, we observed that although we began with a highly potent virus it was completely inactivated when pH 6 was reached, upon addition of acetic acid. This is of interest since the virus, in the presence of an adsorbent, is not affected by acetic acid even at pH 3.2. We could confirm neither the results of Yaoi and Kasai⁶ on the filtration of emulsions at alkaline pH having tried filtration at various acid and alkaline pH, nor those of Green and Eagles¹³ who obtained filtrates of emulsions made up in distilled water or by first passing acidified egg white through the filter.

In an effort to determine whether the casein-alumina method could be applied for practical purposes, an emulsion of calf scrapings was adsorbed, eluted, and filtered in the manner described above. The results obtained with calf scrapings are encouraging but not yet quite as good as those with testicular virus.

At this stage of our work, it is difficult to attach particular significance to any of our observations. Further study in this direction may perhaps result in

the accumulation of sufficient data with which valuable information concerning the properties of vaccinia virus can be formulated.

NOTE: The authors wish to thank Charles R. Tyler of the New York City Department of Health Bureau of Laboratories for repeating and confirming the purification and filtration results both with testicular and dermal viruses.

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Senate Bill 41

PASSED AT SPECIAL SESSION 1933 AND PUBLISHED DEC. 5, 1933

An Act to control stream pollution and providing for the work authorized in sections 65-171a, 65-171b, and 65-171c of the Revised Statutes Supplement of 1931.

BE IT ENACTED BY THE LEGISLATURE OF THE STATE OF KANSAS:

Section 1. That for the purpose of preventing stream pollution detrimental to public health or to the animal and aquatic life of the state, the state board of health, with the approval of the state forestry, fish and game commission, shall make rules and regulations governing the disposal of domestic and industrial sewage wastes by municipalities, corporations, companies or individuals: PROVIDED, HOWEVER, Such rules and regulations shall not prohibit storage of salt water, oil, or refuse in tanks, pipe lines, or ponds. The State Board of Health shall fix fees to cover the cost of services rendered under said rules and regulations, which fees shall be approved by the attorney-general,

and board of regents before they shall become operative.

Section 2. All investigations and services rendered under the provisions of this act shall be made by the division of sanitation of the state board of health in the University of Kansas, and all fees collected shall be turned in to the State Treasury for the benefit of said division of the University of Kansas.

Section 3. Every company, corporation, or individual that shall fail to comply with the rules and regulations of the State Board of Health authorized by this act, shall be deemed guilty of a misdemeanor, and upon conviction shall be punished by a fine of not less than twenty-five dollars and not more than one hundred dollars for each offense. The failure to comply with such requirements in each day in which failure is made, shall be considered to constitute a separate offense.

Section 4. That this act shall take effect and be in force from and after its publication in the official state paper.

The Sanitary Works of Indianapolis*

C. K. CALVERT

Superintendent, Indianapolis Sewage Treatment Plant, Indianapolis, Ind.

SEVERAL years after the Indianapolis Sanitary District was established in 1917 to handle the sewage of the city, the law was amended to include the collection and disposal of ashes and garbage.

Non-inflammable refuse, including ashes, is collected bi-weekly in summer and weekly in winter, and dumped on low ground. Suitable places are available in many localities and the hauls are short. The cost of disposition of 160,000 yards in 1932, including the maintenance of dumps, was at the rate of \$0.707 per cu. yd. Garbage, free from tin cans, broken crockery, paper, etc., is collected semi-weekly in summer, and weekly in winter, from the residence section, and nightly from the hotels and restaurants. It is hauled by trailer train to the garbage disposal plant located on the Sanitation Plant grounds in the southwestern corner of the city. The cost of collection of 30,000 tons in 1932 was at the rate of \$2.505.

At the reduction plant the garbage is cooked at 80 lb. pressure for 2 hours, the grease and liquor drained and the residue dried under vacuum in the cooking tanks, which are steam jacketed. The dried tankage is separated by a current of air into light and heavy portions. The light material, substantially free from glass and metals, is sold as

stock feed with a protein content of about 16 per cent and grease of from 20 to 25 per cent. The heavier portion is percolated to recover the grease and the residue sold as fertilizer base with an ammonia (NH_3) content of about 3.5 per cent. Grease, sold for soap making, is the most valuable product, with fertilizer base second. In so far as the limitation of the physical plant permits, the relationship between fertilizer and feed production is governed by the market. Degreased feeding tankage is finding increased favor under the name of Table Scrap Meal and is more profitable since the grease from it is sold for soap making at a higher price than it commands as feed.

The cost of reducing 28,600 tons of green garbage in 1932 was at the rate of \$3.25 per ton. With interest and depreciation added, the total is \$6.00 per ton. The by-products were—Grease, 66 lb., fertilizer base, 228 lb., and feeding tankage, 23 lb., per ton of green garbage. The price for the materials varies from year to year. In 1929 the return was \$165,000, and in 1932, \$32,000. In the past 5 years, by-products have returned \$3.30, operation has cost \$3.52, and interest and depreciation have been \$2.68 per ton of green garbage.

Sewage, slaughterhouse, and canning wastes had so befouled White River that a survey made in 1904 by Prof. Robert L. Sackett disclosed a black, foul stream which recovered only after many miles of flow. While an Imhoff-sprinkling filter experiment station was operated about 1912, no real progress was made

* Read at a Joint Session of the Conference of State Sanitary Engineers and the Public Health Engineering Section of the American Public Health Association at the Sixty-second Annual Meeting in Indianapolis, Ind., October 9, 1933.

until suits by riparian owners forced the formation of the Indianapolis Sanitary District by the 1917 legislature. The progress of the war interfered with construction, but in 1921 work on the sewage disposal plant itself was started. The clarification plant was operated in 1924 and the activated sludge plant was put in service May, 1925, and both have operated continuously since.

Indianapolis sewage is strong. The census shows the population to be 375,000 but on the basis of B.O.D. of the sewage it is 673,000. While the city covers some 54 sq. miles, the sewage is comparatively fresh when it arrives at the plant. Industrial waste, affecting the strength of the sewage, comes from a large meat packing industry, starch works, and canning plants. In spite of the size of the city and the volume of its manufacturing, there is a very marked daily and weekly cycle in the volume and concentration of organic matter.¹ Such variation presents problems in connection with the operation of the activated sludge plant. With rather indifferent success, considerable time is spent with producers of industrial wastes in an effort to prevent discharge to the sewers of. (1) solids, (2) inflammable liquids, and, especially, (3) grease and oil of all sorts. An unusual appearance of the sewage or the presence of more than average grease or oil is reported at once, day or night, by the grit chamber attendant, and an inspector endeavors to trace it to its origin, which is usually difficult on account of elapsed time.

The first actual treatment given to the sewage is at the grit chamber which it enters through a fixed bar rack with $1\frac{1}{2}$ " clear openings. Rags, entrails, and general debris are removed and burned in a refuse incinerator. The velocity in the grit chamber is about 1' per second, and the detention 1 minute.

The grit is quite clean and used to fill adjacent low ground. Skimmers, located at the downstream end of the grit chamber, retain, and pumps remove such material as may rise to the surface under the conditions imposed. No special oil removing treatment is given and, with the short detention time, removal is imperfect. In order to remove the greatest possible amount of grease the sewage is skimmed at two subsequent points. The skimmed material is burned on an isolated bank. There are 4 grit chambers located ahead of inverted siphon river crossings. The main chamber is given constant attendance and the 3 smaller ones visited once or twice daily depending on the rainfall.

As the sewage reaches the plant proper, it is skimmed and passed into the clarification unit which is of unique design. Three cylindrical screens, with openings $1/16$ " x 2", rotate partially submerged as the sewage flows through a channel. The flow is controlled so that approximately two-thirds of the sewage passes through the screen and one-third, carrying the solids rejected by the screen, passes out at the bottom of the channel to rapid settlers each 12' deep, 15' wide and 120' long, which provide a detention period of about 20 minutes. Sedimentation is very rapid and clean on account of the concentration of the solids. The combination of fine screens and sedimentation results in the removal of almost 40 per cent of the suspended solids. The solids settling on the bottom of the basins are collected mechanically, and 5 per cent solids sludge pumped to deep earthen digestion pits. The settled and screened portions of the sewage mix in a suction well from which they are pumped as clarified sewage to the activated sludge plant. To this point the flow is by gravity except from one small section of the town from which automatic pumps lift the sewage to the gravity lines.

Just before the clarified sewage reaches the activated sludge plant, the returned sludge is added and mixed. The mixed liquor flows into a distribution channel which feeds all the aerators. Spiral flow, induced by air diffusers placed along one side of the aerator only, was first put into service at Indianapolis, and since that time every plant of any size constructed in the United States has been of this type. The diffusers are placed in depressions formed at the time the floor was poured. They are sealed in place with Portland cement which makes removal of whole plates out of the question. The mixed liquor is held under aeration as it flows through the 4 passes of the aerator, the designed period being from 5 to 5½ hours. In practice, the period has been much longer, due to lack of capacity in the settlers.

The mixed liquor passes through a venturi meter between the aerator and the settlers, which are octagonal at the top, and round at the bottom. The feed enters at the ends of the basins, which are substantially 42' x 78' in plan. The clear liquor is taken off by troughs with V-notch weirs and the sludge is removed continuously from the bottom at the center. The mechanism consists of a central drive shaft with a cross-arm at the bottom which carries a slack chain to drag the bottom and prevent the sludge from sticking. The sludge detention time in the settlers is a matter of minutes.

At the time the plant was constructed, a building was partially equipped for the filtration and dehydration of sludge for fertilizer. It was operated for a 6 month period in 1931, the equipment being sufficient to handle about 20 per cent of the activated sludge produced. This period of operation indicated that the cost of production, working at full capacity, would be about \$15 per ton of dry solids, which is more than can be realized for the product at this time.

Indianapolis sludge requires an excessive amount of chemical conditioner before filtration and its cost offsets, to some extent, the low fuel and labor prices enjoyed.

At present the waste activated and primary sludges are digested in deep earthen pits which have given no odor trouble. The method has been very economical and satisfactory since a considerable area is available for this use. Sludge is not seeded as it is pumped to the pits, but the point of delivery is changed frequently so that fresh sludge is discharged into digested sludge areas as much as possible. When a pit is filled it is allowed to stand and the supernatant withdrawn, or allowed to overflow as fresh sludge is pumped in. When it is filled as much as possible, it is allowed to stand idle and complete digestion as draining goes on. It is offered to farmers and market gardeners, being loaded onto their trucks free of charge with a clamshell rig. While the method of disposal has been cheap and satisfactory, it is not possible to dispose of all sludge produced, and when the space available is exhausted it will be necessary to provide some other method of disposal for at least a part of it. Digested sludge, as taken by the growers, contains from 75 to 85 per cent moisture, and on a dry basis, about 45 per cent volatile matter and 2.7 per cent nitrogen.

The quantity of water available for dilution of the plant effluent is very limited, White River reaching a low summer flow of 125 to 175 sec. ft. At low elevations the river consists of a series of pools and riffles. The outfall discharges into a pool behind a dam promoting the deposition of solids which flush out with subsequent rises of the river, resulting in toxic conditions lower down. The bacterial concentration in the river water is of no concern since it is used as a source of domestic supply only after some 125 miles of flow. It

is conceded, by all concerned, that the biologic action in the river may be utilized as a purification process in so far as may be possible without producing offense. With a capacity of the activated sludge plant which will permit the treatment of no more than 35 m.g.d., the oxygen of the river water is exhausted during periods of very low flow, and the problem then becomes one of removing the greatest possible poundage of organic matter regardless of the quality of effluent as measured in p.p.m. Insufficient settling basin capacity makes sludge concentration difficult and, to avoid excess volumes of returned sludge, a very low percentage of mixed liquor solids was maintained in 1931 and 1932. Gradually this practice led to the experiment of using no return sludge at all and it was found that a 60 per cent reduction of B.O.D. could be obtained in a reasonable aeration period. Much more volume can be accommodated under such an operation plan, and actually, a greater poundage of organic matter eliminated. Coagulation of solids occurs and, even at rather high rates of sedimentation, the sludge removed is very little less per m.g. than when using the conventional activated sludge process. The local advantage in this method of operation is

more pronounced in the cooler part of the year than in the summer. With a long period of experience as a guide, plain aeration was utilized in 1933 until the middle of the summer when the return of sludge was resumed for a period. The plant is now being operated without the return of sludge.

This method of operation has affected the unit cost prices very materially since larger quantities of sewage are handled, but imperfectly. In order to have comparative cost figures, the unit of "m.g." has been changed to "Thousand pounds B.O.D. Removed." On this basis, sewage has been treated at a unit cost more than 30 per cent less than by the regular activated sludge process. The plan is recommended only for a special situation as exists at Indianapolis at this time.

During the season of greatest capacity operation, and with the return of sludge, the plant is operated regularly at a cost under \$10 per m.g.

Average performance figures are available for the life of the plant and may be obtained by those interested in them.

REFERENCE

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A New Deal in Health Education*

BERTRAND BROWN

New York, N. Y.

THE other day I heard a man remark that undoubtedly the last stand of "rugged individualism" in this country would be in New York City among its 1,200 separate, independent social and health agencies. He hoped we were on the way toward communizing the industrialists, but feared that it would be a long and tedious task to socialize the social workers.

Abstractly, we Americans, and especially we social economists, go for the principle of coöperation "in a big way." Slogans proclaiming our faith are a commonplace of our daily existence:

United we stand, divided we fall.

Billions of reiterations on our seals, coins and currencies profess our faith in union on a par with our trust in God.

But not so our practice!

A commonplace of our very existence, continuously cited as our social salvation, our highroad to more abundant and glorious life, we who profess and are paid to be socially minded are prone to let it go at that—to substitute lip-service to the *principle* of coöperation for actual community planning, community organization, and community action.

There are few fields of our complex community life in New York City where this is more true than in that of health education.

The forty-odd agencies engaged in

health education in New York City have a natural penchant for doing things in their own ways. But this is perfectly human even if it is extravagant and costly. If the various departments of the municipal government, private agencies and professional and commercial groups engaged in health education in New York City could be brought to coöperate with singleness of purpose in a concerted attack upon the widespread ignorance of individual and community hygiene, the results of their present widely diversified activities would be greatly enhanced.

There is no wide difference of opinion about that. The way toward greater effectiveness in health education in the City of New York is stamped upon every penny of the quarter of a million-odd dollars expended annually for this purpose in the city:

E Pluribus Unum—Create one program out of many.

Before discussing any set-up through which health educational activity in the city might be coördinated and made more effective, it may be profitable to consider what the job of health education involves. What specifically do we mean when we talk about health education? I like to define it in terms of the basic tasks it involves.

I. THE FOUR BASIC TASKS IN HEALTH EDUCATION

In any intelligently planned health educational effort, there are four fundamental considerations present.

* Address before the Health Administration and Education Section, The Welfare Council of New York, N. Y., April 30, 1934.

They may be indicated by the four-part question:

1. What ideas, images, and emotional appeals must be conceived, accumulated, arranged, set forth and produced, and
2. Transmitted through what medium, or by what means
3. To what audiences, in what locality or localities, in order
4. To accomplish what objectives?

Much confusion will be obviated by a clear understanding at the outset that *wherever*, *however*, and by *whom*—ever done, health education is a process which necessarily involves these four basic considerations.

Health education can be intelligently planned and, as a consequence, effectively and economically pursued, only when each of these four fundamental component tasks is considered, not only as a separate factor in the educational process, but in its relation to each and all of the other basic tasks present.

Whether we recognize them or not, these basic considerations are always present in all health educational effort, and not only are they always present; they are always interdependent.

a. *Objectives*.—In order of procedure, the first task in outlining a health education program of any character or kind for any district or borough, or for the city as a whole, is to define clearly and concisely the objectives of the proposed educational effort.

What is it that we are setting out to do?

Over a decade ago (May, 1923), in his last public address, the late Dr. Hermann Michael Biggs suggested 11 objectives for practical present-day public health effort. Five of these were largely dependent for realization upon measures of mass education. Coming from this authoritative source of yesterday, we will cite them here as challenging general objectives for a city-wide program of health education for today. (But for our rugged individualism, all

of them might not still be pressing educational issues for today.)

The 5 of Dr. Biggs' eleven public health objectives, requiring health education for their accomplishment, were:

1. Establishing for every individual the custom of obtaining a periodic physical examination, made by a competent physician.
2. Further reduction in the death rate from the common infective diseases, such as tuberculosis, diphtheria, typhoid fever, scarlet fever, diarrheal diseases of infancy, and others.
3. Through physical examination and instruction as to methods for retarding or arresting their progress, postponement of the age at which death occurs from the cardiovascular diseases and other diseases of later life.
4. The prevention by education and law enforcement of new infections in the venereal diseases, and provision for more adequate treatment of syphilis.
5. The extension of the educational work of the public health authorities as a most effective means of promoting the preservation of health and the prevention of disease.

For practical purposes any or all of these ultimate objectives proposed by Dr. Biggs may be reexpressed in terms of more practical and immediate objectives. Each problem may be translated into terms of a 5-to-10-year plan. Each, moreover, can be expressed in terms of a sequence of particular activities, with first things put first, and with specific indication of what presumably can be accomplished day by day, week by week, month by month, and year by year.

Any set of objectives chosen can be thus translated into next things to be done. But it is only by clearly outlining as a first step the proposed objectives of an educational effort that such effort can be undertaken and conducted with that "intelligence in perspective" which will assure "accomplishment without vague and wasted effort," as Sydenstricker phrases it.

b. *Audiences*.—The second task in outlining a health educational effort of any character is to determine as clearly and concisely as possible who the indi-

viduals are upon whose mental attitudes and behavior achievement of the proposed objective depends.

Once the objective of the health educational effort is defined, it can be pursued *only* through communicating ideas, images, and emotions to individuals upon whose mental attitudes and behavior its attainment depends.

No problem in health education can be dissociated from specific individuals encompassed within the population. The individual is always the end of the effort.

The health educator should not only know *what* the problem is; he should know *where* it is and *who* has it. Only thus can he direct his efforts without waste upon those individuals and groups who most need them. Some problems are city-wide and can be attacked mass fashion across the boroughs. Other problems are local in character, and educational efforts directed at them can be wisely confined to a district, a neighborhood, a block, to selected racial or other groups, or to individual homes.

c. *Ideas, Images and Emotional Appeals*—The formulation and expression of ideas, images, and emotional appeals, which will achieve desired objectives with proposed audiences, constitute a third basic task in the health educational process.

Psychologists tell us that individuals can be motivated along prescribed courses to wished-for attitudes of mind and to fixed habits of action. Factors, present within the individual, are in a sense controls through which he can be motivated into desired behavior.

This knowledge is invaluable to the purposive mass educator. It means that once the objective and the audience are clearly in mind, ideas, images and emotional appeals constitute the ammunition of the educational task; that success is dependent in a large measure upon the authentic, convincing and

persuasive quality of materials used.

Motivation of the individual into improved health behavior depends majorly upon the choice of ideas, images, and emotional appeals which, utilizing his innate drives, will influence his mental attitudes and behavior, and consequently secure his coöperation in attainment of the desired objective.

d. *Media of Communication*—The fourth basic task of the health educator is that of choosing from the manifold channels available the media which can be employed most economically and effectively to communicate information and impressions to the audiences which have been selected because they are composed of individuals upon whose coöperation achievement of the desired objective depends.

Any educational effort, to be economically and effectively pursued, must necessarily be directed toward individuals according to their accessibility through established channels of communication.

Any program of health education which relied upon direct contact with the individual and family would seem hopelessly inadequate in a community the size of New York. Even if practicable, personal contact may not offer the best means for those who know, to communicate information to those who do not know.

Media available for mass education in the City of New York afford a high degree not only of coverage, but of selectivity both in locality and in intimacy and directness of personal contact with individuals.

The City of New York has been called the center of the machine age. In no quarter of the earth's surface is the health educator offered a more elaborate range of choice in the media which he will utilize to communicate ideas and purposive impressions to individuals and groups. And nowhere can knowledge and proficiency in the

use of these media be utilized to better advantage.

These are the four basic tasks confronted in outlining and pursuing any health educational effort. And I am unable to escape from two conclusions with regard to them.

First, that any program of health education to be fundamentally sound must be considered in the light of these considerations which are always inherently present.

And, second, that failure to recognize the presence and interdependence of these fundamental factors, more than any other thing, accounts for the lag in the development and refinement of our health education services on a par with other important professional fields encompassed within the public health movement.

Because of their importance to our present discussion, I repeat that any sound approach in the formulation of a health education program for the City of New York would provide primarily for accomplishment of the four-part task indicated by the question: (1) What ideas, images and emotional appeals must be secured; (2) to transmit through what media; (3) to what audiences; (4) to accomplish what objectives?

These specifically are the tasks which any organization engaged in health education must equip itself to perform. Whether or not they are recognized, they are always present in any intelligently pursued educational effort. Moreover, I repeat—these four tasks are always interdependent.

Naturally, therefore, the setting up of an economical and effectual plan of health education for New York City would seem to resolve into the coordination of available resources through some type of organization which would be designed, equipped, and staffed to assume leadership in the performance of

this sequence of tasks, which, though highly specialized, are interlaced in an inescapable relationship.

II. AN INSTITUTE OF HEALTH EDUCATION

For the foregoing reasons, if we were able to start with a clean slate and formulate an entirely new deal in health education in the City of New York, we would perhaps create a central organization designed specifically (and perhaps only) to assume leadership in the carrying out of these functions.

We would reallocate present personnel and recruit new personnel on the basis of its aptitude for, and training and experience in the knowledge and technics implied in this sequence of tasks. And may I add that no one would have a voice in the administrative direction of this effort who was not appreciative of the necessary and important part which each of these basic tasks must play in the complete cycle of the educational process.

In the last analysis, the success of an organization depends upon the background, training and qualifications of the persons who maintain it, the staff which renders its services.

Obviously, two main divisions of effort, in addition to that of administration and financing, are required to maintain the functions above outlined—one to carry on the all-important research functions; the other to devote itself exclusively to the interpretation and dissemination of health knowledge.

His program of objectives and his texts and subject matter, the mass health educator will need to obtain from those whose primary concerns are fact-finding and the diagnosis and prognosis of problems in the field of public health. At the same time and from the same sources he should be informed of the relative needs of the various elements which compose the city's population. He should be told not only what the problem is; he should

be told where it is, and who has it. Prepared with a consciousness of the ultimate use to which it is to be put, the health administrator and his research assistants should hand this information to the mass educator on a silver platter.

Moreover, no field of public health effort offers the research worker a more gaping opportunity for service in setting up procedures for the measurement of results, than this field of health education. His is the bookkeeping function to determine the success or failure of any particular educational method employed, and to measure progress in the attainment of any prescribed objective.

Perhaps the occasion calls for a larger view of the size of the job that confronts us and for the consideration of a new institutional means for coping with it.

An adequate plan for interpreting modern knowledge regarding the prevention of disease and the promotion of personal and community health in the City of New York, would, in my opinion, envisage the existence of an institute of hygiene which would assume leadership in the development of a concerted health education program set up along the lines above indicated.

A committee of the American Public Health Association, of which Dr. Victor G. Heiser of the Rockefeller Foundation is chairman, and of which I am a member, has considered at some length the possibility of creating in New York City a central institute of health education. This committee foresees such a central institution for spreading health knowledge as being housed in a popular museum of hygiene.

This Museum of Hygiene would constitute the graphic and animated textbook of the Institute of Hygiene. That it would house exhibits, specimens, models, photographs, charts, and animated apparatus for health teaching, is taken for granted. But it would also

plan to make full use of, if not build its program around, such modern channels of popular education as the motion picture, radio and television, which would magnify its usefulness beyond present comprehension. Obviously, the importance of showmanship, of freedom from academic restraint, should be recognized if such an educational plan is going to be effectual in raising the health standards of the masses.

For a health education institute and museum which would be a cloistered reference source, maintained chiefly for the further enlightenment of already privileged groups, Dr. Heiser's committee has not much enthusiasm. For a vital living institution, a theater and active institute of hygiene, equipped to utilize all available media to extend its services to the masses, alert to whatever new channels of popular instruction the future may bring, and committed to maintain continual contact with those whom it would exist to educate, this committee has great enthusiasm.

That its discussions are not visionary, the committee is assured by sober like-opinions from other cities, where similar plans are being discussed—notably Chicago.

Visionary? Any group whose task involves the spreading of health knowledge, which has not become aware of the necessity in this day and age of planning its program and its equipment to meet the competition for attention which it confronts, has not adequately qualified itself for leadership in its field. I repeat—that the occasion calls for a larger view of the size of our job.

Just a word about finances.

We are addressing ourselves to the need for a New Deal and a better day in public health education in the City of New York.

Our text? "There is no wealth, but life."

The quarter-million dollars expended

annually for health education by member organizations of this section, is a pittance as compared with the sums utilized in propagandizing their constituency on the commercial fads and fallacies of health. It would not even pay for Amos and Andy.

More money must be made available to do the kind of a health education job that we are talking about. But health educators are not the ones to raise it.

If the health educator acquires proficiency in the knowledge and skills required in the practice of his profession, and if he efficiently and economically employs its principles and technic to a degree approaching adequacy to the opportunity which confronts him, he will have no time to raise the money required to maintain his efforts. That is a specialized function requiring its own technic and its own personnel.

It is high time that we made a clear distinction between money raising and health education; that we ceased to accept a scheme of financing as a program of health instruction. It is high time that we quit harking back to educational methods employed in the peek-a-boo shirt-waist days and recognize that we are confronted with new problems and the challenges of new competition commanding proficiency of a new and highly specialized character.

III. MOBILIZING FOR HEALTH EDUCATION

However effective any central institute of hygiene instruction may be, it will not eliminate the necessity for much of the important and essential health educational activity now carried on by various agencies in the city. And that would not be its intention.

The advantages, however, of these groups associating themselves in an

effort to unify their programs are obvious. The existence of the Welfare Council's newly created section on Health and Education is an evidence of the recognition of this principle on the part of its members.

It would seem timely for this group to consider the creation of some set-up or scheme of coördination through which the health education activities of the various departments of the city government and of the various professional groups, private agencies and commercial groups, may be correlated and brought into a unified program of health education.

While such an organization would naturally follow the lines of general health activity in which several groups are now engaged, orientation and direction of their efforts along the lines of the fundamental considerations above implied, would greatly simplify their problems.

The organization of a city health council, like that set up the other day in the borough of Brooklyn through the coöperative efforts of the borough Chamber of Commerce and of the Brooklyn Council for Social Planning, may be the appropriate means to this end.

The form of organization for such an association would seem an appropriate matter for careful study by this group. But any adequate form of organization proposed would certainly embrace all of the resources available for increasing the health knowledge of the city's population.

Any program adopted would include all of Dr. Biggs's 5 objectives, now 11 years old! And any operating machinery set up would be designed, equipped, and staffed to assume conscious leadership in the performance of all of the specialized tasks inherently present.

OUTLINE OF INSTITUTE ON MATERNAL CARE

VICTORIAN ORDER OF NURSES FOR CANADA

THE Victorian Order of Nurses for Canada was first requested by the Public Health Nurses of the City of Toronto (The Community Health Association) to arrange to hold an institute on maternal care in that city early in 1931. The object of the institute is to emphasize from the nursing viewpoint the importance of, and to teach what is adequate prenatal care; and how working in coöperation with the medical profession and through effective use of existing agencies to make such care available for every expectant mother. Medical advice is sought and appreciated in so far as teaching material is concerned. Some of the most essential points to be dwelt upon are the community relationships involved, the nurse's responsibility toward the medical profession and health officials, to expectant parents, and with regard to the education of the public as to the necessity of medical advice and follow-up throughout pregnancy.

It is considered quite probable that nurses in cities other than Toronto and whether engaged in institutional, private duty, or public health work, may be interested and that there may be requests to hold institutes in different parts of Canada.

The subject matter consists of general information with regard to maternal care and the part the nurse may well take in providing this care; the essentials of prenatal teaching; possibly two demonstrations on delivery and post-partum care, with plenty of time for questions and discussions.

It is better if possible to have various nursing groups interested because of the contribution they are able to make. A

Victorian Order nurse gives leadership, but at the final session a medical man attends to answer such questions as may be submitted to him. It is rather important that it be someone with a decided public health viewpoint and the nurse herself has largely made these contacts. The discussions run practically throughout 2 days which means that a nurse can scarcely engage in any other activity at the same time.

The usual plan is that locally those arranging for the institute assume responsibility for securing a room and the necessary equipment, make the local contacts and arrangements, and become responsible for registration and collection of fees, which are later turned over to the National Office. The fee is \$3.00 per person except where there is a registration of 30 or more, when it is reduced to \$2.50.

Nationally, the responsibility of the Victorian Order is to supply the person to direct the institute, pay her expenses, and supply any necessary teaching or demonstration material.

They do not put on an institute for less than 15 nurses and the limit is 40. As the sessions are usually held in the class room of a local hospital, the matter of equipment does not prove any difficulty. They supply the necessary teaching or demonstration material.

When a local group of nurses arrange for an institute they assume the responsibility of interesting the nurse, of registration, securing a place to hold the institute, collecting the fees, and turning them in to the national office; the Victorian Order of Nurses bearing all expenses apart from those already mentioned.

The nurse is an exceptionally well qualified person to undertake this work. She is a Canadian graduate, has not only had public health training and held positions as supervisor in the Toronto City Department of Health and National service of the Victorian Order, but has also had obstetrical, mothercraft training and experience in England and has more recently observed institute work as carried on by the Maternity Center Association, a specialized organization, in New York.

The Victorian Order of Nurses for Canada welcomes the opportunity of extending its field of usefulness. In working out the plan briefly outlined above it is hoped to evolve something truly Canadian in character which will result in more intelligent, uniform, and

effective teaching being given, and through bringing representative nurses together for conference and discussion under leadership, should strengthen the relationship between medical and nursing professions; and eventually through the interested health and social agencies represented and working toward this end, prove a valuable contribution to the welfare of the mothers and future citizens of the country.

Good prenatal care is nothing but the proper foundation for good natal attention. Neither is complete in itself, and if either is inadequate, both may result in failure. . . . It is only during pregnancy that the proper preparations can be made for the all important natal and post-natal care. . . . Prenatal care is not an end in itself but only a means to an end (Dr. Fred Adair).

SECOND ANNUAL REPORT OF THE DIRECTORS OF THE H.S.P.A.-EWA PLANTATION HEALTH PROJECT

MARTHA R. JONES, PH.D.

May 31, 1933, marks the close of the second year of the plantation "Health Project" which has been conducted jointly by the Ewa Plantation Company, the Hawaiian Sugar Planters' Association, and the Research Department of Queen's Hospital, Honolulu. A brief review of the activities undertaken and accomplishments to date is herewith submitted.

INFANT FEEDING CLINICS

In July, 1932, "health centers" were opened in "C" and "Lower" Villages, making a total of 4 "centers" which cover the entire plantation. All cooking is done in one center and the milk formulas and other foods—ready to be served—are delivered to the other centers where the babies living in the surrounding districts are brought once daily and fed. Formulas for other feedings are taken home.

Enrollment of babies in the Health Center is voluntary with parents and they pay a flat fee of \$1 per month for each child. An additional charge is made for extra food over the amount allowed for the \$1 enrollment fee. During the past year the receipts from parents covered approximately three-fourths of the cost of the food.

ENROLLMENT AND ATTENDANCE

Number of babies enrolled June 30, 1933	225
Per cent enrolled of those eligible (birth to 2 yrs. of age)	92
Daily attendance (per cent of those enrolled)	85

The age limit of 2 years for enrollment in the feeding clinic was removed during the year. When there is one child enrolled in the Health Center, parents, in general, object to enrolling the new baby unless the older one is discharged. The excuse is invariably

"expense." The need for increasing the age limit for enrollment is shown in the marked reduction in growth rate and increase in dental decay in those children who have been discharged at 2 years of age. Few parents know what constitutes normal development in babies and children and they accept poor posture, sunken chests, flat heads, thin bodies, bowed legs, diseased tonsils, decayed and abscessed teeth as inevitable and with little or no concern. Those babies who have been largely or exclusively fed on food provided by the Health Center are outstanding in physical development. . . .

MORBIDITY

General—Infant health has improved, as has that of the preschool children. There have been few cases of pneumonia, with only 2 deaths (1 infant with whooping cough and 1 preschool child following measles) in more than 2 years. There has been no death from diarrhea and enteritis since the health project was started, and no case among infants that warranted hospitalization in more than a year. Mothers have learned how to prevent beriberi, and there has been no case which could be diagnosed clinically during the past year. The incidence of impetigo, pink eye, and ear infections has been comparatively low. Illness is to a large extent restricted to the children of noncoöperative mothers. . . .

Venereal Disease—There are a number of families on the plantation, various members of which show clinical or other evidence of syphilis. Eight of 9 Filipino women thought to be diseased, whose record is 81 pregnancies, have given birth during the past year or are now pregnant. There are 6 living babies, all of whom received some anti-syphilitic treatment. The expectancy of life in all cases is good; nevertheless, 2 of this number already show marked clinical evidence of the disease. They

are all offspring of alien parents, most of whom are too ignorant or indifferent to practise birth control. It is doubtful whether permanent cures are ever effected in syphilis, and in all probability, some, if not a considerable number, of this group will eventually become public charges. . . .

Dental Decay—Dental decay is a systemic disease. "Odontoclasia," a type of dental decay which is ravaging the teeth of the babies and young children of Hawaii, is a sensitive, and probably the best, indicator of community health. It is associated with high infant mortality, diseased tonsils, stunted growth, susceptibility to disease, and abnormal development of the jaws, nasal and other facial bones, which often lead to a succession of ills which persist throughout life.

Odontoclasia has its beginning in prenatal life. It may occur in unerupted teeth and even in the teeth of the unborn. In a group of 50 Ewa Plantation Oriental babies studied before the health project was started, 40 had decayed teeth at 1 year of age, and 49 at 2 years. Odontoclasia can be prevented and arrested by diet—and apparently in a very simple way—the substitution of taro and potatoes for grain foods.

Concomitant with the tremendous and continuous reduction in infant mortality and morbidity on the plantation during the past 3½ years, there has been a parallel reduction in the incidence of odontoclasia. . . .

EDUCATION

Baby Conferences—In addition to the feeding clinic which is held daily, conferences with mothers during which each baby is weighed, measured, examined, and his teeth charted are held bi-weekly. In addition to advice as to general care, mothers are instructed in regard to the kind and amount of food needed for their babies. An effort is

made to examine all babies under 1 year of age at least once each month.

Prenatal Clinic—Mothers are being taught by means of X-rays of the bones of new-born babies and other tests that the diet of the mother during pregnancy has a marked effect upon the bone and tooth development of her child. They have learned something of the anatomy of their own bodies, how the fetus grows, and the principle of birth control. As a result, the babies are being born with a better start in life. Fewer babies were born the past year than in any preceding year—97 as compared with 119 in 1932. . . .

Medico-dental-social-economic Research—The Ewa Health Project is the clinical application of at least 12 years of medico-dental research. Its ramifications include already social and economic aspects which may be far reaching in significance. An analysis of conditions as they used to exist in Hawaii and as they are today, and the interpretation of the findings in the light of scientific knowledge and animal

experiments, lead to the conclusion that a return to the type of diet employed by the ancient Hawaiians will automatically solve many of the economic-health-social problems of the community. A basic principle of nutrition which has to do not only with health, but life itself, is involved.

Can grain eating people from foreign lands be induced to eat native foods—particularly taro and sweet potatoes? They have to be taught. When doctors, nutrition teachers, cafeteria directors, social workers, and those who have to do with the feeding of others accept the fact that taro and potatoes have a very special value in the diet in the tropics and are not interchangeable with grain foods, much progress will be made. It is a new idea and has to be demonstrated. Ewa is staging the demonstration, and is doing it in an ideal way—the people making the demonstration pay and profit; the plantation profits; the community profits; the world and the millions of people yet to be born will profit. . . .

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ATTENDANCE OF MEMBERS AT ASSOCIATION ANNUAL MEETINGS

THE Medical Officer, England, has this to say in its March 31, 1934, issue concerning the American Public Health Association.

"In America . . . cohesion and interdependence of all local units hardly exists. The Federal Government has certain powers over all the States, the States over the counties, and the counties over the smaller communes, but all these units are in the main independent. The American Public Health Association is the chief body in promoting unity of design and action. It has no power save that of persuasion, but this in a body so comprehensive and united and so efficiently organized is powerful, if not compelling."*

There is one short period in the year when the powerful and compelling influence of the American Public Health Association is at its apogee. That is during the time of its Annual Meeting, when it is truly on parade and the world of public health and preventive medicine watches with interest for its pronouncements, knowing well that the course of public health will be affected by what transpires during that time.

The Association is, of course, its membership, the 4,300 public health workers from every state in the Union, from Canada, Cuba, and Mexico, representing federal, state, county and city health departments, and every type of agency directly or indirectly concerned with health and welfare.

The Annual Meetings of the Association presumably reflect the interests and activities of its members. The Annual Meeting presumably presents to the world the story of public health achievement of Association members during the previous twelvemonth, and points the way for the succeeding twelvemonth; yet at such

* See page 809 for complete article.

an important time, only a small percentage of that membership is on the scene and takes part in the deliberations.

At the Sixty-second Annual Meeting in Indianapolis in 1933, the registration was nearly 1,000. An analysis of attendance, made with a view to determining section participation, follows:

	<i>Total Membership of Section</i>	<i>Number of Members Registered at Indianapolis</i>	<i>Per Cent at Annual Meeting</i>
Health Officers	922	143	15½
Laboratory	513	101	19½
Vital Statistics	99	23	23
Public Health Engineering	407	60	14½
Food and Nutrition	210	32	15
Industrial Hygiene	145	24	16½
Child Hygiene	344	56	16
Public Health Education	456	53	11½
Public Health Nursing	436	49	11
Epidemiology	106	32	30
Unaffiliated	642	43	6½
Total	4,280	616	14

By subtracting 616 from 1,000, we find 384 guests were present. Most of these were professional public health workers, it is true, not affiliated with the Association, however, as members. It should be stated at this point that guests are expected and warmly welcomed. May the Pasadena Meeting bring us many more than 384. Nevertheless, it is highly important that the number of members in attendance be in greater proportion to non-members than three to two.

The attendance at an Annual Meeting of only 14 per cent of the total membership is not as it should be. The policies of the Association itself are shaped during the Annual Meeting; officers are elected; and resolutions adopted committing the entire Association to certain principles—these important things should be acted upon by more than one-seventh of the organization's constituents.

The advantages of membership in the Association have been described many times, most emphatically by members themselves. The membership, even in a time of depression, holds up as remarkably as the health of the country. That fact, in itself, is proof that the member finds his connection with "a body so comprehensive, united and so efficiently organized" worth while. The advantages of attendance at Annual Meetings are obvious to the several hundred members who return again and again, it having been demonstrated to them that they cannot afford to stay away. Other hundreds should realize that their identity with their profession means more than the payment of annual dues and a monthly scanning of the JOURNAL. The Annual Meeting is for them, for every member, offering to them the opportunity to make themselves felt and heard for their own ultimate good, the good of their profession and the public health movement.

The Association will be on parade again from September 3 to 6 in Pasadena. Elsewhere in this issue appears the preliminary program which needs no word of editorial commendation, since it speaks eloquently for itself. Let us, as members of the Association, attend the meeting in full expectation of personal enrichment and in such numbers that the full purpose of the Annual Meeting is abundantly achieved.

THE DEPRESSION AND PUBLIC HEALTH EXPENDITURES

IT is not news to those interested in public health, and especially to health officers and health workers generally, to know that the expenditures for health throughout the United States have been cut down to a dangerous degree on account of the depression. According to what are believed to be reliable statistics, in 1929 the average expenditure for public health in American cities was \$1.00 per capita per year. For 1934, the expenditure will be a little more than \$.70. In some cities as well as states the cuts have been so great as well nigh to destroy the efficiency of the health organizations. In certain cities the health budget has been reduced very much out of proportion to the revenue of the city. In the city of Birmingham, Ala.,¹ for example, while the revenue has declined 27 per cent, the health budget has been cut 64 per cent. The appropriation for Parks and Recreation has been cut 10 per cent; for Library 40 per cent; for Police Department 42 per cent; for Fire Department 34 per cent—that for the Health Department 64 per cent!

While Birmingham has never been noted for its large per capita health budget, in 1915–1916 it was reduced to \$0.155 per capita per annum. There followed the typhoid epidemics of 1916–1917, and those who studied these outbreaks were convinced of the connection between the decrease in money and the increase of disease. In 1928 the citizens of Birmingham seemed to have been sold on the public health department on account of the good work which was evident to them. They apparently became so well satisfied with the organization and operation that they dismissed the matter from their minds. The depression developed and, as in all such times, health problems increased tremendously, in spite of which, the health organization has been badly crippled by lack of funds.

An example of what has taken place is the food handling establishments, of which there are some 2,000 in the city of Birmingham. Each one has a certificate assuring the public that it has been inspected from the health standpoint and the citizens are still patronizing these establishments with the confidence that the certificates they exhibit mean something. As a fact, the Department of Health has been reduced to a point where there are only 2 food inspectors to cover the entire 2,000 establishments. Is it possible that 2 men, however efficient and however honest, can cover so many establishments? We believe not.

Another example is in the public health nursing service. It is generally accepted that there should be 1 public health nurse on the average for each 2,000 people. The force in Birmingham has been so reduced that each nurse has 23,000 people to care for.

Birmingham is not the only city in the United States which is suffering. The cut in health funds has been very general and very deplorable. In some cases unfortunately politics seems to be playing a part also. Never has there been a time when efficient health work was more needed than at present. It is true that we have been blessed with a succession of years characterized by good weather and a marked absence of epidemic diseases. Only here and there have there been outbreaks and, with the possible exception of measles during the spring of 1934, these outbreaks have been localized, and not extensive even in the communities in which they occurred.

We have always believed that public health was a good deal like religion.

In the face of danger we turn to a higher power and become very devout. We wrestle mightily in prayer with the Lord when epidemics decimate our population, when droughts occur cutting off our food supplies, or when floods destroy our growing crops, but when things go well, the human mind is such that it forgets danger. We are very much like the little boy who said his prayers regularly at night, but not in the morning on the ground that he could take care of himself during the day time. This has been expressed aptly in the old quotation:

"The devil was sick, the devil a monk would be,
The devil was well, the devil a monk was he."

1. *Birmingham's Health*, The Jefferson County Board of Health, Feb., 1934.

AMEBIC DYSENTERY IN CHICAGO

THERE are many reasons why the outbreak of amebic dysentery in Chicago in 1933 still holds intense interest. Some of these are practical and some scientific. On the practical side it will be recalled that the Exposition for 1934 opened in May. Already some of the daily papers are asking whether precautions have been taken to make the city safe for visitors, and repeating the charge that the news last year was suppressed. On the scientific side it must be pointed out that, as far as we have been able to determine, this is the first epidemic of the sort which has ever been recorded. The health officers had an entirely new problem to deal with, and there is no question that it took them by surprise, as it did everyone else. The paper read before this Association on October 9, 1933,¹ attracted little attention; so little, in fact, that a prominent officer of the Public Health Service who heard it went back to Washington and did not even mention it. Some days later the report of a physician in Indianapolis that there were 5 or 6 cases of the disease in that city, all traceable to Chicago, gave the first intimation of its seriousness. Following this, on November 25, came from Boston² what was probably the first information which showed how widespread the infection was, cases in Canada and elsewhere being reported. There was no official publication from the Board of Health of Chicago, as such, until November 18,³ though on November 14, the radio was used.

The health authorities of Chicago have been blamed severely for suppression of the news and it has been charged that it was done in order not to scare visitors away from the Exposition.

A careful and what we believe to be an unbiased investigation fails to substantiate such a motive, though the facts are as just stated.

It must be remembered that very few of these cases occurred in Chicago, two having been reported on August 16, the date which the authorities fixed as the beginning of the outbreak. Owing to the period of incubation, which has been fixed by several observers on epidemiological evidence as from 12 to 30 days for the majority of cases, and even longer for others, visitors had arrived home in Canada and various parts of the United States before being taken sick. Doctors have all been taught that amebic dysentery is a tropical disease, and were not looking for it. Various diagnoses, such as appendicitis, colitis, ulcerative colitis, etc., were made. Operations for appendicitis were entirely too frequent, and the evidence shows that the majority of deaths have occurred among those who were operated on under mistaken diagnoses. Up to January 24, 1934,⁴ 721 clinical cases of amebic dysentery in 206 cities have been found and traced to Chicago,

in addition to which, 1,049 carriers have been found in Chicago. Ninety-four per cent of the cases detected were guests at either Hotel C or A. Hotel A obtained its water from a tank on the roof of Hotel C. This water had been used for cooling and air conditioning purposes before being pumped to the roof. On January 22, a committee met in Chicago for 6 days and heard reports. Their conclusions have entirely changed the picture if they are accepted. In the meantime engineers have studied the situation, and several men who are specialists in the study of tropical diseases have been called upon.

As early as November 22, the hotels incriminated were directed to improve their plumbing arrangements. The Board of Health has had some 15 engineers or technical assistants making an intensive study of the water and sewage systems of the hotels involved. It must be said that they were in a mess. Like Topsy, the system has just "growed," without noticeable planning. The house engineers have been in the habit of making repairs and additions without notifying the city. The inspection of hotels is not what it should be. Several city departments have inspectional powers, such as the Building Department, Fire Department, License Department, Department of Gas and Electricity, Smoke Inspection Department, Department for the Inspection of Steam Boilers, Department of Public Works, and Board of Health. It would seem that concentration of responsibility might have led to better results. Since the depression and the bankrupting of the city by the former administration, there is a shortage of inspectors, and even new work is scarcely kept up with, much less watching old work, repairs, alterations, etc. The evidence is that two hotels were responsible for 94 per cent of the cases detected. Careful charts have been made showing the dates of registration of the visitors and the dates when their bills were paid, as well as the appearance of the symptoms and the course of the disease as far as possible. If any considerable number of cases have occurred in the city, they have not been detected.

The hotels involved have been ordered to rearrange entirely their plumbing systems and to install new works throughout. The older part of the chief hotel dates back to the time when steel pipe was considered the best material for such work. The sanitary sewer pipes were found to be badly corroded, so that the writer pushed a five cent kitchen fork through the main pipe. Many leaks existed and, in a number of places, wooden plugs now badly rotted had been used to stop holes. Unfortunately, the sanitary sewer which carried some 62 per cent of the load of the hotel passed directly above the tank in which water was refrigerated for the dining rooms and the floors. The ice machines, the laundry, the machine shop, the room for the preparation of the desserts, etc., were all on the same floor and were below the level of the street sewer. Two 4 inch sewer pipes intended for overflow emptied into a cement trough under the laundry tubs. All leakage was carried to sumps and forced to the level of the street sewer.

The committee mentioned found that following two rains on June 29 and July 2, the street sewer broke, flooding the basement of Hotel C and running directly into the ice storage house. In their report a good deal of stress was laid on this, but the epidemiological evidence collected since shows that following this accident there was a remission of cases for approximately 3 weeks, which the engineer in charge attributed to improved drainage!

The numbers of carriers and active cases, most of whom worked in the basement of Hotel C, has been repeatedly given.⁴ It seems that the committee approached the question with a firm conviction that the disease was due to carriers and active cases among food handlers, and there is little doubt that the great majority of

people who have studied the question have believed in the same origin. Leaky sewers and cross-connections and a generally bad condition of plumbing would have furnished the means of spreading the infection. Great doubt has been thrown upon this method of origin by the investigation of Spector and Buky.⁵ The drying of the amebae rapidly destroys them—a matter of minutes. In an experiment on this point, the hands of doctors were painted with a thick emulsion of feces rich in cysts. Drying for even a few minutes destroyed them, as tested by the vital staining which protozoölogists hold constitutes an accurate diagnosis between living and dead organisms, the living cysts refusing to take aqueous eosin, while the dead ones absorb it readily. These experiments seem to do away in great measure with the carrier question; but it does not entirely absolve food handlers who are carriers and serve salads which are sent up in a moist condition.

There are still many problems to be answered. What, for example, is the relation between the large cyst and the small cyst? Some of our best known authorities claim that they are the same, but Dr. Spector finds that she can cultivate the large cysts without trouble, whereas failure attends the great majority of her efforts on small cysts. On the face of it, this would indicate some difference in the two organisms.

Certainly the studies in Chicago will compel us to rewrite our chapters on amebic dysentery. The committee referred to acknowledges that there is much room for study and, while we deplore the tragic events which have made this investigation necessary, there is little question that in the end, all health officers in this country as well as others, will be in a better position to avoid such outbreaks in future and to handle them when they occur.

A symposium on the subject was a feature of the meeting of the American Medical Association in Cleveland in June, and for our own meeting in Pasadena in October a discussion has been arranged.

REFERENCES

1. Tonney, Hoelt and Spector, *J.A.M.A.*, Nov. 18, 1933, p. 1638.
2. Lund and Ingham, *J.A.M.A.*, Nov. 25, 1933, p. 1720.
3. Burdson, Raylinn, and Fishbein, M., *J.A.M.A.*, Nov. 18, 1933, p. 1636.
4. *J.A.M.A.*, Feb. 3, 1934, p. 369.
5. *Pub. Health Rep.*, Mar. 23, 1934, p. 379.

EAST AND WEST SHALL MEET

LONG ago, the poet said—

“For East is East
And West is West;
Never the twain shall meet.”

Fortunately, this does not apply to public health workers, for those in the East and those in the West speak the same language, uphold the same traditions, carry the same burdens, strive for the same results, and they meet together at least annually for purposes of mutual advancement and development. Public health workers of California and other western states are gratified at the prospect of the Sixty-third Annual Meeting of the American Public Health Association in Pasadena. There is a traditional pride in serving as hosts to the public health workers of the nation, and there is a sense of appreciation in the opportunities for acquiring knowledge through practical experience and instruction provided by leaders in the profession who come from older communities and institutions. Meeting in a far

western state tends to break down all provincialism, for sectionalism is rare in the free atmosphere of the rugged West.

It is little more than 80 years since oxen-drawn, covered wagons were dragged across the overland trails to California, and it is little more than 60 years ago that the first railroad train brought passengers to California. In 1934, visitors come to the Golden State on luxurious trains, comfortable buses, fast airplanes, and in privately owned automobiles. It required many weary months of travel for covered wagons to cross the Rocky Mountains, plains, and the deserts. Fast trains now cover the same routes in 3 days, while airplanes soar over the old overland trails within a few hours. Time and space are almost annihilated and costs of transportation have become almost negligible.

There is much of interest to public health workers in California. Fifteen full-time county health units can be visited by automobile within a few hours. An excellent system of perfect highways connects all of these places of interest. There are at least five higher institutions of learning that are worthy of visiting—the University of California and the University of Southern California at Los Angeles, the California Institute of Technology at Pasadena, Stanford University at Palo Alto, and the University of California at Berkeley.

The Yosemite Valley, with its many waterfalls and granite peaks, the Sequoia National Park, with its marvelous big trees, Lake Tahoe, nestling mile-high among the pines of the Sierra, the Redwood Highway—a paved road between enormous redwood trees—skirting the northern California coast, the old missions scattered from San Diego to Sonoma, the famous Seventeen-Mile Drive at Monterey, the Rim of the World Drive and high Sierra lakes in the mountains of Southern California, the motion picture studios at Hollywood, the Mexican settlement at Agua Caliente, and dozens of other attractions will provide recreational facilities to please every guest. California bids you partake of its western hospitality!

ALVAH HUNT DOTY

DR. ALVAH HUNT DOTY, member of the A.P.H.A. since 1896, and a Charter Fellow, died on May 28 at Pelham Manor, New York, at the age of 79. He was born in Albany, graduated from the high school there, and afterward attended the Rochester Military Academy. His degree in medicine he received from Bellevue Medical College in 1878.

Appointed an inspector on the staff of the Health Officer of the Port he subsequently was made diagnostician of the New York Board of Health, and then chief of its Bureau of Contagious Diseases.

He was appointed Health Officer of the Port of New York on January 2, 1895, by Governor Morton, through which he became also a member of the Board of Health of New York City. As Health Officer of the Port, it was his endeavor to facilitate commerce and to keep out communicable diseases from the City without unnecessary delay, and with as little inconvenience to merchants and passengers as possible. His writings testify to his scientific attainments and broad knowledge of medicine.

In 1913 he was appointed by Theodore N. Vail Medical Director of the Employees Benefit Committee of the American Telephone and Telegraph Company, the Western Union Telegraph Company, and the Western Electric Company. Here he continued his investigations, writing on "The Care of Tuberculous Employees by Corporations as Employers." This was followed by "The

Value of Examinations of Applicants for Industrial Employment," 1916; "Poliomyelitis," 1917, "Outlook and Problem of Public Health," 1919; "Typhus Fever and Quarantine," 1921; "Common Sense in the Prevention of Influenza," 1922.

Among the measures of preserving health Dr. Doty expressed his views in a book *Walking for Health*, published in 1924.

To the Bulger charges in 1911, made in a spirit of hostility, Dr. Doty's defense in the *New York Times*, December 7, fully covers the matter. These charges were petty and did not constitute sufficient reason for the action taken by Governor Dix. He was defended in this matter by a number of the ablest and best known physicians in the City of New York.

Dr. Doty was a tireless worker. He usually arose at 5 o'clock in the morning, and gave himself unsparingly and with unfailing energy to the work of his profession. His highest pleasure was in service.

He had confidence in himself and rightly so, for he was well equipped and peculiarly fitted for the service he engaged in, always giving the closest attention to even the smallest details. There was no branch of sanitary science with which he was not familiar. In his medical relations he was ethical and invariably spoke well of others, never envying anyone his success.

He was sincere, with a fine sense of honor, cheerful, of engaging personality, interesting in conversation, with much humor, enjoying his friends. He was moderate in his habits, a loyal friend, and devoted husband and father. Because of his modesty, the credit of much of his work was given to others.

TWELFTH INTERNATIONAL VETERINARY CONGRESS

A MOST interesting event will be the Twelfth International Veterinary Congress to be held at the Waldorf-Astoria Hotel in New York from August 13 to 18. It will be under the patronage of President Roosevelt, but the scientific president of the Congress will be the noted Professor E. Leclainche, Director of the Bureau of Epizootics, Paris, France. From England will come Sir John M'Fadyean and practically every country in the world will be represented by men prominent in the veterinary profession and in the sciences related to it.

Among those who have promised to be present and to give papers are Ramon of toxoid fame, Bang of Copenhagen, who has done so much in tuberculosis of cattle, Guérin who was a coworker with the late Professor Calmette on BCG, and many others. Although the program has not yet been published, there is an assurance of an abundance of material of scientific interest to physicians in general as well as to the veterinary medical profession and to laboratory workers.

There is every reason why the medical profession, especially that branch of it devoted to public health, and the veterinary medical profession should act in concert with each other. Every year shows the diseases of animals which are transmissible to man or which are carried by animals to man. It has been the wish of the writer for many years to bring the two professions more closely together. Here is an opportunity of which our public health workers should avail themselves gladly. Since the Congress will be held in New York, it will be easy of access to a large part of the public health workers in our country.

Further information can be obtained from Dr. H. Preston Hoskins, 221 North LaSalle Street, Chicago, Ill.

INDUSTRIAL HYGIENE

Seventh International Congress on Accidents and Industrial Diseases, Brussels, 1935—This Congress is to be held in July, 1935, under the leadership of Dr. Glibert. The object of the Congress is to coördinate the work of the Permanent Commission on Occupational Accidents and that of the Permanent International Commission on Industrial Medicine. The program of the Congress will consist of official reports on questions which have been placed on the agenda and also independent reports on the same subjects. The program has been divided into three sections, each of which will deal with two questions:

A. Surgery:

I. Delayed effects of injuries to the cranium

II. Traumatism of the hand and fingers

B. Occupational Diseases:

I. The prevention of industrial dusts

II. Pathologic action of gases escaping from burning veins in coal mines

C. Joint Session:

I. Objective manifestations of pain

II. Electricity

A number of participants have already signified their intention of giving papers—two from this country, Dr. R. R. Sayers and Dr. Yandell Henderson, who will report upon the physiologic and pathologic effects of coal mine gases. Additional papers are invited from all countries.

For further information address Dr. Fred H. Albee, 57 W. 57th Street, New York, N. Y., who has been appointed American President of the National Committee for the Section of Accidents,

or Dr. Emery R. Hayhurst, Chief, Division of Hygiene, State Dept. of Health, Columbus, Ohio, who is American President of the National Committee for the Section on Diseases.

Prize Offered by the Congress in Geneva—The following announcement has been received from Dr. L. Dejardin, Secretary-General of the mentioned Congress, Brussels:

1. The committee of organization of the Sixth International Congress on Occupational Accidents and Diseases, held in Geneva in 1931, established a prize of 1,000 francs to be awarded to the author of the best work, original and unpublished, on the subject "The Importance of Previous Physical Condition in Estimating the Sequelae of an Industrial Accident."

2. Physicians of all countries are eligible to compete for the prize.

3. The prize will be awarded at the coming Seventh International Congress which will be held in Brussels in July, 1935.

4. Typewritten manuscripts in two copies must reach the Secretary-General of the Congress, in Geneva, before December 31, 1934. They may be written in French, English, German, or Italian.

5. The author will retain ownership but must publish it in the year following the award of the prize.

6. The jury will be composed of the committee of organization of the Congress of Geneva.

7. The manuscripts should not be signed, but should carry a symbol, which is to be reproduced on a sealed envelope containing the name, address, and titles of candidate.

Correspondence regarding the above may be addressed to Dr. Fred H. Albee, 57 W. 57th Street, New York, N. Y., or Dr. Emery R. Hayhurst, Ohio Health Department, Columbus, who are the chairmen of the American committees, surgical and medical, respectively, representing the Seventh Congress.

Industrial Safety and Health Standards—A committee to consider standards for the safety and health of industrial workers, for application to the codes of fair competition promulgated by the National Recovery Administration, was appointed in February, 1934, by Secretary of Labor Frances Perkins. The permanent committee established consists of representatives of the following organizations:

- American Federation of Labor
- American Standards Association
- National Bureau of Casualty and Surety Underwriters
- National Recovery Administration (one representative each from the Administrative Division, Consumers' Advisory Board, Industrial Advisory Board, Labor Advisory Board, and Legal Division)
- National Safety Council
- New York State Department of Labor
- U. S. Chamber of Commerce
- U. S. Department of Commerce, Bureau of Standards
- U. S. Department of Labor
- U. S. Department of Labor, Bureau of Labor Statistics (one representative each from the Division of Accident Statistics and the Labor Law Information Service)
- U. S. Department of the Interior, Bureau of Mines
- U. S. Department of the Treasury, Bureau of Public Health Service

As a result of the deliberations of the committee and on recommendations by the Secretary of Labor, the National Recovery Administrator directed that the following provisions be included in every code which had not been formally submitted by the industry on March 14, 1934:

Every employer shall provide for the safety and health of employees during the hours and at the places of their employment.

Standards for safety and health shall be submitted by the code authority to the administrator within 6 months after the effective date of the code.

The manner in which these provisions, which are now embodied in most codes, will be given execution, is next briefly outlined.

(In examining the list of representative organizations and the provisions for execution, the editor feels that health and hygiene have not been given proper weight or hearing, and calls attention to the findings of Dr. C. O. Sappington in his investigation of the sickness and accident experience in the Edison Electric Illuminating Company of Boston, reported in the *Journal of Industrial Hygiene* for July, 1924 (Vol. VI, No. 3, p. 94):

Since the Edison experience has shown that sickness causes twenty times as many cases of absenteeism as accidents and is responsible for seven times as much loss of time from work, it would seem rational that any program for solving the problem of lost time would give results if money was intelligently used to further disease prevention. This does not mean that vigilance should be relaxed in the slightest degree in attempting to prevent accidents. Accident prevention has received so much attention in the past, however, that it now seems evident that emphasis might profitably be placed on earnest attempts to thwart the inroads of disease in industrial establishments.

Proposed Industrial Medical Code in the United States—The American College of Surgeons has submitted to the National Recovery Administration in the United States a draft medical Code for industrial employees.

The general principles of this Code include the proposals that all new employees should have preemployment examinations and all employees annual health audits by doctors employed by the industries; that industries should establish individual or joint pathological and X-ray laboratories, that defects revealed by examinations be treated at the cost of the industry in so far as they come within the scope of workmen's compensation or other State laws, and otherwise be referred to the family physician of the employee, who should be provided with the records and facilities of the industrial laboratories at minimum cost; that the facilities of the laboratories should be available to the family physician for the care of the families of employees.—

Indust. & Labour Inf., 49, 13:435 (Mar. 26), 1934.

Eye Protection in Industry—This pamphlet includes a self-appraisal for safety engineers and plant managers. It is estimated that at least 15 per cent of the blind of America lost their sight because of occupational hazards.

More money is paid by employers each year as compensation for eye injuries than is paid for injuries to any other part of the body. This totals \$10,000,000 a year in the principal industrial states, but this cost represents only part of the picture. Thus, the Travelers Insurance Company found that the indirect cost to industry of accidents is generally four times as great as the direct cost.

The chief eye hazards of industry are those due to accidents, diseases, and excessive eye fatigue. (The methods of prevention of each of these are briefly detailed.)

The self-appraisal form is arranged to check and give values for each type of protection found to exist against eye hazards. The first part of the appraisal concerns the plant, the second part, the worker, and the third part, the job.—Louis Resnick, National Society for the Prevention of Blindness, Inc., *Publication No. 77* (50 W. 50th Street, New York, N. Y., Price 5¢).

An Unusual Case of Pneumoconiosis—The authors report, in some detail, a case of dense, bilateral pulmonary fibrosis which developed rapidly in a man, aged 48, who had been a construction foreman in a tunnel project for one year. The dust, from a white rock of undetermined composition, was very dense, and drilling had been done without the use of water or masks. The symptoms began about 15 months after the exposure ceased. The man's occupation for about 18 years had been concerned with grading roads, in rock quarries, and laying concrete. The X-ray and autopsy findings seemed typical of acute silicosis. The silica

content was 50.5 of the dry lung ash.—George F. Grisinger, T. R. Boling, and Bert Bradford, *West Virginia M. J.*, 29, 10:436–38 (1 ill. of lung roentgenogram) (Oct.), 1933.

Major Articles in the Journal of Industrial Hygiene—The March, 1934, issue, Vol. 16, No. 2, contains the following:

The determination of mercury in air and in urine. A. M. Fraser, McGill University.

Mercury-laden air: Toxic concentration, proportion of mercury absorbed, and urinary excretion. A. M. Fraser, K. I. Melville, and R. L. Stehle, McGill University.

A rapid method of dust sampling and approximate quantitation for routine plant operation. Theodore Hatch and E. Ward Thompson, Harvard School of Public Health.

An appraisal of the lead hazards associated with the distribution and use of gasoline containing tetraethyl lead. Robert A. Kehoe, Frederick Thamann, and Jacob Cholak, University of Cincinnati. "There is no reason to fear the existence of danger to the public health from the distribution and use of leaded gasoline."

The effects of the inhalation of hydrogen fluoride. I. The response following exposure to high concentrations. Willard Machle, Frederick Thamann, Karl Kitzmiller, and Jacob Cholak, University of Cincinnati.

The book reviews refer to *Industrial Chemistry, An Elementary Treatise for the Student and General Reader*, by E. R. Riegel, University of Buffalo, pp. 784, 233 figs., 2nd ed., New York: The Chemical Catalogue Company, Inc., 1933. Also, *Workmen's Compensation for Silicosis*, Report of the Committee on Pneumoconiosis, A.P.H.A., paper, pp. 39, Assn. of Casualty and Surety Executives, New York, 1933. The usual abstracts of industrial hygiene literature complete the issue, pp. 25–42, followed by an author index for the abstracts.

The May, 1934, issue, Vol. XVI, No. 3, contains the following:

A cause for the decrease in the number of ions in air of occupied rooms. G. R. Wait, Carnegie Institution of Washington.

The action of mica dust on pulmonary tissue. A. Policard, University of Lyon (France).

Roentgen technic with especial reference to the examination to diagnose or exclude silicosis. Henry K. Pancoast, and Eugène P. Pendergrass, University of Pennsylvania.

Sericite in foundry dust. Cornelius S. Hurlbut, Jr., Harvard University, and David S. Beyer, Liberty Mutual Insurance Co., Boston.

Quantitation of impinger dust samples by dark-field microscopy. Theodore Hatch, Harvard School of Public Health, and C. L. Pool, Rhode Island State Board of Health.

An automatic dust recorder. Willis G. Hazard and Philip Drinker, Harvard School of Public Health.

A death notice is given of Robert Prosser White, M.D., M.R.C.S. The book reviews cover (1) *Chronic nephritis and lead poisoning*, by L. J. Jarvis Nye, pp. 138, Sydney, Australia, Angus & Robertson, Ltd., 1933; (2) *Industrial health service*, by Leverett Dale Bristol, pp. 170, Philadelphia: Lea & Febiger, 1933; (3) *The principles of heating and ventilation*, by H. M. Vernon, pp. 232, London: Edward Arnold and Co., 1934. The abstracts complete the issue, pp. 43-73, followed by an author index for the abstracts.

Incidence of Illness Among Male Industrial Employees in 1933 as Compared With Earlier Years—The frequency of cases of sickness causing absence from work for more than one week among a group of 152,203 male industrial employees was lower in 1933 than in any other year since 1921 when the record was started. Compared with 1932 the decrease in sickness incidence was substantial. This result is somewhat surprising since the 1932 rates were below the average for the 5 preceding years.

The group under consideration is composed of male employees of 38 industrial firms most of which are located in the North Central, North Atlantic, and New England states, but a number of employees of these companies are

scattered in almost all parts of the country. The records on which the present report is based are those of sick-benefit organizations maintained either by the company or by its employees or coöperatively by both.

It is possible, of course, that the sickness rates might be higher if unemployed persons were included, but this consideration does not invalidate the year-to-year comparisons of sickness frequency among men working on a full-time or part-time basis. To some extent the decrease may be due to selection, *i.e.*, workmen on the payrolls now may be somewhat healthier as a group than those employed in 1928 and 1929 when the demand for labor was greater. Selection, however, does not appear to be the all-important factor. (Several tables show the frequency of disability by causes.)—Dean K. Brundage, U. S. Public Health Service, Release B-455 (received 5-7-34), 8 pp. mimeo.

Compensation for Occupational Diseases in Czechoslovakia—In 1933 the Bohemian Workers' Insurance Institute at Prague awarded compensation in 114 cases of occupational disease, distributed as follows:

Silicosis, 53 cases (6 fatal); glassworkers' cataract, 22 cases; lead poisoning, 18 cases; miners' pulmonary cancer (radium), 12 cases; eczema and nystagmus, 2 cases each; poisoning by mercury, aniline, carbon bisulphide and chlorine, and "muscle disease," 1 case each.—*Indust. & Labour Inf.*, 49, 11:359 (Mar. 12), 1934.

A Spanish Association for Industrial Medicine—A Spanish Association for Industrial Medicine was officially founded on January 17, 1934.

The Managing Committee of the Association includes Dr. Oller of Madrid as Chairman, Dr. Garcia Tornel of Barcelona as Vice-Chairman, and Dr. Pofo of Madrid as Secretary. The As-

sociation is limited to 40 members, excluding corresponding members and honorary members.

The headquarters of the Association are in Madrid.—*Indust. & Labour Inf.*, 49, 11:359 (Mar. 12), 1934.

Occupational Diseases in Germany—The reports of the German industrial trade guilds contain information relating to compensation accorded for occupational diseases in the years 1929–1932:

Year	Cases Notified	Cases Compensated
1929	22,258	1,924
1930	15,006	3,255
1931	9,681	2,290
1932	6,493	1,711

In general, the number of cases of occupational diseases has thus decreased. This is attributed partly to the decline, owing to the depression, in the number of persons employed. It should be noted that, though the number of cases notified has fallen regularly, the same is not true of the number of cases compensated. Another table classifies the cases by industries. As a rule, silicosis was the chief affliction notified and compensated in each of the last 2 years, followed by lead poisoning.—*Indust. & Labour Inf.*, 49, 3:83 (Jan. 15), 1934.

Protection of Japanese Workers—A brief synopsis is given of (a) the anti-tuberculosis campaign in Factories by the Bureau of Social Affairs, and (b) the preparation of a new bill for the protection of workers against white lead so as to comply more nearly with the Draft Convention, adopted by International Labour Conference in 1921.—*Indust. & Labour Inf.*, 49, 9:292 (Feb. 26), 1934.

Lead Poisoning in Australia—The problem of occupational lead poisoning is at present attracting much attention from Australian experts. In

Queensland, from July, 1931, to May, 1933, inclusive, 189 workers were admitted to hospitals. The question of occupational lead poisoning was also discussed at a meeting of the New South Wales branch of the British Medical Association on October 26, 1933, at which two papers were read dealing with the advanced diagnosis of lead poisoning and with the blood symptoms of such poisoning (*Med. J. of Australia*, December 16, 1933). The medical press observes that it is astonishing that such a state of things as that discovered at Mount Isa, in Queensland, should occur in the present state of our knowledge of this disease.—*Indust. & Labour Inf.*, 49, 9:293 (Feb. 26), 1934.

A Clinical Investigation of the Symptoms of Duco-Lacquer Poisoning—The admission to hospital, in the autumn of 1933, of a 20-year old painter's apprentice suffering from psychic ailments including depression, led to inquiries into the conditions under which he had been working.

It transpired that while at work with duco-lacquer, sprayed on to various surfaces by a compressed air apparatus, he had felt drunk and then had suffered from headache and a sense of heaviness with irritability. This case led the authors to investigate duco-lacquer work in Copenhagen. Of the approximately 200 persons thus employed in motor-car factories, etc., 73 were examined. A set of questions was drawn up, and the answers of the workers were noted with the following positive results: Drowsiness, 54; lassitude, 63; giddiness, 42; feeling drunk, 33; anorexia, 19; nausea, 13; vomiting, 11; pain in the heart region, 18; sore throat, 55; sore nose, 50; sore eyes, 42; salivation, 21; irritability, 47; disinclination for work, 42. In 36 cases these symptoms disappeared after a short holiday. The 15 workshops in-

spected could be classed in three groups according to the measures taken to protect the workers. Several of the workshops had provided masks of various designs, but nowhere were they found in use.

After discussing the various precautions against duco-lacquer poisoning, such as artificial ventilation with specially designed apparatus, the authors mention as the last, but perhaps most important, factor—that of the solvent of the lacquer. They believe that if all the solvents on the market were to be systematically analyzed and the most dangerous eliminated, a considerable reduction could undoubtedly be effected in the manifestations of duco-lacquer poisoning. The number of these solvents is legion.—M. Ellerman and J. Jakobsen, *Hospitalstidende*, 76:1213–21, 1933; *Bull. Hyg.*, 9, 4:235 (Apr.), 1934.

The Diagnosis of Lead Poisoning—The pharmacologist, Prof. Dr. Behrens, who has for years studied questions pertaining to lead, spoke recently before the Berlin Medical Society.

By the use of radioactive lead isotopes, with which he poisoned mice, he was able to establish that, contrary to other older views, lead poisoning constitutes a genuine cumulative disease resulting from a difference between the intake and the excretion of the poison. Lead accumulates chiefly in the liver and kidney, and secondarily in the bones. In the blood there is an adsorption by the red corpuscles. In the bones it is significant that the storage occurs chiefly in the subepiphyseal areas and under the periosteum. By the use of the radioactive lead the demonstration is simple, as the lead produces light spots on a photographic plate. It was possible in this manner to demonstrate that the lead undergoes

a rapid resorption and a slow excretion in the animal, and that it is a highly cumulative poison. But, when large quantities are ingested, a considerable portion is not resorbed by the intestine but is eliminated with the feces. The elimination of the stored portions takes place slowly; namely, along with the bile into the intestine and by way of the kidney. The elimination occurs in the form of lead sulphate, which is soluble with difficulty.

Behrens discussed the methods for the demonstration of small quantities of lead. He has adopted the method of H. Fischer, which, by means of a dye (diphenylthiocarbazone), demonstrates colorimetrically lead in quantities as low as thousandths of a milligram. Behrens emphasized that researches must be instituted to discover where the borderline between the normal and the pathologic secretion of lead lies. Until that has been done, it will be impossible to render an expert opinion in questions concerning the degree of disability or amount of compensation.—Berlin Letter, *J.A.M.A.*, 102, 19:1626 (May 12), 1934.

Federal and State Penal Institutions—A supplement accompanying the above issue of *Industry Report* tabulates the information obtained concerning prisoner employees in various federal and state penal institutions. The material concerns particularly the types and locations of such institutions, normal capacity, sources and reasons for confinement, number of employees, number of guards and other employees killed, cases of tuberculosis developed by employees, the prison population as of 7-1-28 and 7-1-33, with a column of comments referring principally to accidents, killings and population. Institutions comprising juvenile training schools and those for women are included.—Edited by N. W. Pettys.

EDUCATION AND PUBLICITY*

To the Health Officer or Other Chief Executive:

That your department or your association may benefit more fully from the Pasadena meeting we invite your consideration of the following:

- 1—That you assign one or more of your staff to attend and to report on sessions of the Public Health Education Section.
- 2—That you assign one or more of your staff to examine and study much of the material at Education and Publicity Headquarters.
- 3—That this year you give special thought to the practicability of sending to Pasadena staff members who usually do not get to attend A.P.H.A. meetings.
- 4—That before your delegation starts for Pasadena there will be made up a list of questions to be answered and matters on which information is to be gathered by one or more of your staff.

Bigger and Better Space at Pasadena—More space than ever before and better located space will be available for health education and publicity headquarters at Pasadena. There will be an ample collection of portfolio display material from the Russell Sage Foundation and the Social Work Publicity Council. Among this will be some special collections revised or made up for the occasion.

We will share with Scientific Exhibits the collection of material brought by Dr. W. W. Peter from his trip among health workers in other countries. And across the aisle will be the Scientific Exhibits, many of which will be of particular interest to those concerned with health education.

Please Write Before You Pack—As soon as you decide what you will send to Education and Publicity Headquarters at Pasadena please explain

what you have in mind, addressing Evart G. Routzahn, chairman, Education and Publicity Headquarters, 130 East 22d St., New York, N. Y. You will receive shipping and other information.

Very Much Wanted for Pasadena—Because we will have space, and because we will have the audience, we hope for unusual contributions of exhibit material from health agencies.

From nationals we would like portfolio or scrapbook collections of their health education material and their handbooks, publication lists, and other aids to local health education and publicity workers.

From commercial sources and special services similar portfolio or scrapbook collections of material available free or otherwise throughout either the United States or Canada.

From state and local departments and associations we would like to select material and would appreciate information at the earliest possible moment about projects in health education, radio

* Please address questions, samples of printed matter, criticism of anything which appears herein, etc., to Evart G. Routzahn, 130 East 22d St., New York, N. Y.

programs, and other types of material which might be collected in a portfolio or other form convenient for examination by conference delegates.

Or, have you devices or display material or projection material? Probably we could arrange for showing 16mm movies, if any are offered.

In all cases such material should be sent direct to Pasadena. Do not send it to New York. But please write in advance so that we may know exactly what is being sent, and may forward shipping instructions.

A copy of a memorandum on making up portfolio collections of samples will be sent free upon request to Evart G. Routzahn, Russell Sage Foundation, 130 East 22d St., New York, N. Y.

In all cases when copies are available—free, or for a price, or for a definite amount of postage—please give specific information to that effect.

It will add to the interest and value of your material to include notations as to use made of what you send, number issued, costs, and so on.

All material should be sent with charges fully prepaid.

If you wish your material returned please be sure to make specific arrangements for repacking and return shipping.

"Free" at Pasadena—A special table at Education and Publicity Headquarters will be provided for free material for distribution. Thus you may share with others any surplus of printed matter or other material.

Please write for shipping instructions.

Bring Plenty of Address Cards—If you don't fail us and do attend the demonstration session led by Mr. Routzahn, and get into any of the conference hours and study the displays at Education-Publicity Headquarters, you will wish to have a lot of your address cards. You may substitute 3 by 5 inch

slips on which has been typewritten your name, title, department or health agency name, and address in full.

Various publications, items of information, and samples will be sent to you free of expense by simply noting on a card or slip a number or word you will hear in one of the conference hours, or you will find marked in one of the display portfolios. Wonderful!

Conference and Consultation—At practically all hours when Public Health Education Section is not in session at Pasadena there will be consultation and question service at Education and Publicity Headquarters. The editor of this department will be assisted by officers and members of the Section. *We want to learn about your successes and your problems.*

Special group conferences will be held daily on such subjects as

Homemade lantern slides and their use; practical projection possibilities for promotion and propaganda; how to lay out a year's program; making use of the Women's Crusade next fall; window displays and other exhibits; radio broadcasts; amateur movies; better and cheaper house organs.

For Business and Pleasure—*All those who have decided that they will join the Public Health Education Section* are invited to join with members and fellows of the Section in the annual business dinner.

It never is a melancholy affair and it is the one period of the year when any considerable group may get together for acquaintanceship and for conference on the advancement of health education throughout the continent.

If you happen to be one of the unfortunates who will not get to Pasadena please write us a letter or send a telegram to be read at the business dinner. Address to an officer of the Section or to the editor of this department. Especially would we like to hear from our fellow-members in Europe,

Asia, Africa, Australia, and south of the Rio Grande River.

In the *Journal* for May, 1934—References to health education appeared in several articles in the May, 1934, issue of *American Journal of Public Health*. The following are of interest:

"Public Health With the Civilian Conservation Corps Work Camps." Editorial.

"Medical Sensationalism in the Press." Editorial.

"Health and Beauty" (page 484).

"Annual Conference of the New England Health Education Association" (page 448).

A Correction of the Year Book—Please note correction of Committee on Health Education Institutes on page 30, *American Public Health Association Year Book*, 1933-1934. Cross off the name of Evert G. Routzahn who happens not to be a member of the committee.

Motion Picture on Typhoid Fever—If you know of a 35mm or 16mm motion picture for sale, rent, or loan, please tell Dr. Frank J. Jirka, State Director of Public Health, Springfield, Ill.

Where to Study Health Education?—A hopeful health worker has written to Dr. H. E. Kleinschmidt, National Tuberculosis Association, 50 W. 50th St., New York, N. Y., asking where to find a summer school course in public health education.

Please report any course of any type to Dr. Kleinschmidt who will inform this inquirer, and will then let us pass the information on to *Journal* readers.

Where will health education courses be given next fall or winter?

Which of the professional public

health schools give courses, or part courses?

Does any state offer correspondence or other extension courses?

Please tell us—for the readers of the *Journal*.

And who would care for a correspondence course, and how much would you be willing to pay for it?

SAFETY

"The Dangerous Age" (fatal-accident record of young drivers) and "There's No Place Like Home—For Accidents" offer usable material. *Travelers Standard*, Hartford, Conn. April, 1934. *Free*.

The 1934 wall calendar issued by the Utica, N. Y., Mutual Insurance Company, is the latest of a series, each page dealing with a simple, commonplace "accident." The sketch on each sheet and the accompanying conversational caption tells the story in a flash.

"The Great American Gamble" is the latest of the series of large-page pamphlets making use of picture diagrams and other graphic devices to emphasize automobile hazards and the high death and accident rates due to reckless or unintelligent driving. Earlier issues: "They Call Us Civilized"; "Tremendous Trifles"; "Worse than War" (out of print). Copies *free* upon request. Travelers Insurance Co., Hartford, Conn.

For the reduction of street accidents the grand prize has been awarded to Evanston, Ill., by National Safety Council. The winners by population groups were: Milwaukee, Providence, Grand Rapids, Evanston, Fond du Lac, and La Grange. Details as to what the cities did to make the awards possible appear in *Public Safety*, 20 N. Wacker Drive, Chicago, Ill. April, 1934. *Free*.

BOOKS AND REPORTS

Manual of Veterinary Bacteriology
—By *Raymond L. Kelser, D.V.M., A.M., Ph.D.* Baltimore: *Williams & Wilkins*, 1933. Price, \$5.50.

Since textbooks on this particular subject are few, the first edition, published June, 1927, was received with much interest and appreciation by the veterinary profession and by the medical profession as well because of the inter-transmissibility of some animal and human diseases.

In this second edition, the author has improved the *Manual* very much by the addition of new material. A chapter has been included on the "Outstanding Phases of Bacterial Variation" as at present conceived, written by Major James S. Simmons, Medical Corps, U. S. Army.

In the nomenclature and classification of bacteria, the author has followed Bergey and the committee assisting him.

Another point that adds interest is the introduction to the section on protozoa, by Charles F. Craig, Director of the Department of Tropical Medicine, Tulane University Medical School. This is splendidly written and aids one in making use of the following chapters on this subject.

The title would indicate that it is a book on bacteriology but it is much more than that. It includes briefly not only all phases of the bacteriology of diseases in animals but also other disease producing organisms of animals, such as fungi, protozoa and viruses, and associated subjects, as serology, hematology, preparation of veterinary biological products and the bacteriological examination of milk and water.

For those not already acquainted with bacteriological methods and common forms of disease producing organisms, Part I, Bacteria, Their Morphology, Physiology and Classification, and Part II, Bacteriological Methods, will be of much interest. Part III, Infection and Immunity, is well written.

The printing and make-up of the book are excellent. A few typographical errors have been noted, only one of which needs mention. In the index, page 552, "Yersen" should be "Yersin."

The second edition of this *Manual of Veterinary Bacteriology* is a valuable addition to veterinary literature and the author is to be congratulated for its careful, concise and accurate preparation.

A. J. DURANT

Bergey's Manual of Determinative Bacteriology—By *David H. Bergey*. Baltimore: *Williams & Wilkins*, 1934. 664 pp. Price, \$6.00.

The first edition of this book appeared in August, 1923, since which three others have followed. The previous editions have been reviewed and criticised by various journals.

The changes in the present volume are best described in the preface signed by the Committee on Manual. Two new genera have been recognized in Tribe Bacteriae, namely Genus *Brucella* and Genus *Listerella*. Genus *Pfeifferella* has been combined with Genus *Actinobacillus*. The descriptions of *Leuconostoc*, *Propionibacterium*, *Bacterioides*, and Order *Myxobacteriales* have been amplified. Descriptions of some 50 new species have been included, while several organisms have been

omitted as distinct species, and the names recognized as synonyms for other species.

The committee points out that much intensive study is still needed to supply information on other genera, especially those in which a large number of species are included, and considers it probable that certain organisms now recognized under distinct names are really the same as other species.

The book is well printed and is remarkably free from typographical errors. It represents a vast amount of careful study and compilation.

MAZÛCK P. RAVENEL

Chinese Medicine—By William R. Morse, M.D., LL.D., F.A.C.S. *New York: Hoeber, 1934. Price, \$1.50.*

This is one of the series of handbooks under the general title "Clio Medica," edited by E. B. Krumbhaar, which aim to present in a concise and readable form special phases of medical history that underlie modern medical science.

The theme of this interesting little book is that the principles and practices of Chinese medicine are based upon the Chinese theory of cosmogony, a branch of metaphysics that deals with the character of the universe as an orderly system or cosmos. Chinese cosmogony is in turn based upon a sexual dualism, the theories of the *Yang* and the *Yin*, the male and female. The author quotes Halde as saying that "*Yang* is the principle of heat and dryness, *Yin*, the principle of cold and humidity. The normal state, that of perfect health, cannot exist save as those two principles exist in perfect equilibrium."

In his preface the author states that Chinese "medical literature is large and of considerable historical value"; furthermore, that in China today "the whole history of medicine is on view," making it "the most wonderful oppor-

tunity for scientific research that can be found in the world," for side by side with modern methods introduced and maintained by medical missionaries and now reinforced by the funds and efforts of many native and foreign institutions, the practices of mythical, legendary, prehistoric, ancient, medieval and historical medicine are at this very moment being used.

The opening chapter on Chinese Natural Philosophy, points out that Chinese legendary accounts of medical practices date back some 3,000 years B.C., but that there are definite evidences of well developed medical practices at least 1,000 years B.C.; furthermore, that Chinese medicine reached its zenith, first, during the Han Dynasty, about 170 A.D., and again in the Sung Dynasty (960–1279 A.D.) during which valuable medical discoveries were made. Although Chinese medicine, founded upon a peculiar theory of cosmogony, contained some deep truths, yet "in actual practice their therapeutic procedures have become a pot-pourri of facts, fancies, and fatalism. At the present time the majority, if not all of their healing practices consist of a weird medley of philosophy, religion, superstition, magic, alchemy, astrology, *feng shui*, divination, sorcery, demonology and quackery." In fact, since the earliest time, "astrology has been considered the right eye and alchemy the left eye of medicine." Alchemy is said to have "originated in China and reached Alexandria in the third to fifth century A.D. But Chinese alchemy had as its goal both long life and immortality. It aimed to transform inanimate things into 'spiritual essences.'" Thus Taoism and alchemy came to mean much the same thing, for the "Taoists were said to have discovered an *elixir vitae*." It is of interest to note that the Chinese characters for alchemy, literally translated, mean "the golden pill of immortality."

The Chinese physician of the old school is steeped in the tenets and theories of alchemy. He strives to attain for his patients long life and immortality. In addition to much "medicine," he generally employs two very practical methods, first, a comprehensive regimen of mental and physical discipline; second, a regulated and selected diet of articles containing vital essence or force.

Since the Chinese practice of medicine appeals largely to the emotions, and since "fear of the unknown, unseen, multitudinous spirits predominates in Chinese religion, ethics and medicine," it was only natural for the people to create their own gods of medicine which are about as numerous as are the diseases of mankind. These gods have different ranks depending upon their relative importance. Among the few of the highest dignity are two who were celebrated physicians during the Han Dynasty. One of them Pien Ch'iao, famous as an internist, is renowned as the first to use a general anesthetic. The other, Hua T'o, the God of Surgery, whose birthday is nationally recognized, performed many major operations on the brain, abdomen and other parts.

The keynote of diagnosis in Chinese medicine is the palpation of the pulse, but the better physicians also employ other important procedures such as a scrutinizing personal and family history, a careful inspection of the patient, and listening (not auscultation) to the quality and character of the patient's voice and breathing. But of all these, palpation of the pulse is the most important. In fact, "the general consensus of opinion among the Chinese today is that all a doctor needs to recognize any disease is to feel the pulse." Fifty-one chief types of pulse are classified, of which 27 indicate a fatal ending to disease. Although the Chinese physician, like the rest of his countrymen, possesses the sense of

touch to a remarkable degree, such diagnostic methods "border on the ridiculous and possibly cross the line into absurdity."

The materia medica of China is probably more extensive than that of any other country. The Chinese physician believes that "every substance ingested into the body liberates either *Yang* or *Yin* spirit or force. If rightly chosen, healing results; if wrongly, disease occurs." The key to treatment is the production or depletion of *Yang* or *Yin* in the body through the action of suitable remedies which establish an equilibrium in the flow of these cosmic forces. A catalog of the great majority of these Chinese medicines reminds one of the list of remedies suggested by the third witch in Shakespeare's "Hamlet." The author states that "there is a large mass of useless, objectionable and nauseating remedies in their pharmacopeia, but there are many that are very useful, and moreover have been used for centuries for the same diseases and in somewhat similar manner as they have been and are used in the West, e.g., mercury, iron, arsenic, rhubarb, ma huang (ephedrine), camphor, aconite, iodine, seaweed, kaolin, arrow-root, castor oil, etc., etc."

The short chapters on Chinese anatomy and physiology show that although a few facts were discovered and accepted, these fundamental branches of medicine were to the Chinese physician almost "pure phantasmagoria."

The operation of acupuncture, a strictly Chinese procedure, consists in the introduction of hot or cold metal needles, 3 to 24 cm. long, into the living human body as remedial agents, "the object being to penetrate at certain definite points one or more of 12 hypothetical, invisible, undissectable channels, which, according to theory, contain the vital *Yang* and *Yin*," the male and female creative and destructive essences that exactly counterbalance

each other in all nature. Acupuncture aims to reestablish the harmony and proper balance of these essences in those parts of the body affected by disease.

"Chinese medicine at its best is vitalistic; ours is materialistic. Past masters in sophisticated adaptations, the Chinese have a system that is not elastic or adaptable to newer circumstances. Fixed in the thralldom of fate, the exercise of free will is well nigh impossible. Chinese culture and intelligence are not inferior, but China is stagnant and static, while the West is progressive and dynamic. The West investigates and attempts to control nature's laws to human needs, while China's theory premises that what has begun must continue and man must adapt himself to nature."

With a fanatical reverence for the past the Chinese "closed their minds to scientific advancement in medicine soon after the preliminary stages were passed. Superstitions and bizarre medical practices by individuals and groups, secular and religious, occur in the West. The difference is, China is swamped in superstition while the West is emerging from it."

There being no provincial or municipal regulations for practitioners, the number of those who call themselves doctors are legion. "Probably 80 per cent of the medical practices in China are carried out by charlatans." Since this book was printed, the National Government of China has promulgated a decree that all physicians, both native and foreign, will have to undergo an examination in order to procure a license to practise.

The author designates his book as an outline of the vast subject of Chinese medicine. It is an outline but vastly more; it is an encyclopedia of historic facts which are so pleasingly assembled that the book gives the effect of a delightful narrative. In addition his many quotations from Chinese philosophy and

medicine are such gems that the book deserves to be included in public and private libraries for its literary value alone.

HARVEY J. HOWARD

Nature, M.D. *Healing Forces of Heat, Light, Water, Electricity and Exercise—By Richard Kovacs, M.D. New York: Appleton, 1934. 173 pp. Price, \$2.00.*

This little treatise is the newest of the Appleton Popular Health Series. It is a handy, almost pocket size volume, written in the author's clear, concise, and easy to read style. As it is intended chiefly for lay use all technical terms are avoided as far as possible. Where they are used their meaning is explained in simple words, understandable even to those who know nothing of medicine or physics.

There are five main divisions or chapters, each dealing with one of nature's forces useful in maintaining health or in combating disease.

Heat, its application in the home by the simple common devices now available, and in the hospital by the newer more scientific methods is described.

Next, the use of *Water*, plain or mineralized, internally or externally, by baths of varying temperature; by sponges, packs, compresses; by whirlpool baths or Scotch douche; by enemas and colonic irrigations, is discussed and its rationale explained.

The use of *Light*, both natural and artificial, its benefits and dangers, and the precautions to be observed in its use are all well covered in chapter three.

Electricity in its most modern forms is described and a few of its chief indications given in chapter four.

The fifth chapter tells of *Massage, Exercise and Rest*, the why's and wherefore's of each in its proper place. A brief but sufficient index is included.

A book of this character has been

needed for some time to help in the debunking of the self-styled physical therapist and to offset the ballyhoo of the manufacturers of apparatus for lay use. It gives the public a simple yardstick by which to measure the value of physical agents. It is a splendid guide for the man-in-the-street on this subject.

H. M. HERRING

Miss Gay's Adventures in First Aid

—By *Margaret Daly Hopkins, R.N.*
New York: National Press Printing Company, Inc., 1933. 60 pp. Price, \$.15.

This small book dramatizes, in an interesting way, first aid treatment, particularly for babies: for choking from swallowing small objects; for eye injuries resulting from small objects getting into them, and for the removal of such objects; for the removal of small objects from the nose; and for ear treatment to dislodge small objects or to care for other emergency treatment.

It emphasizes the need of skilled medical treatment for these difficulties, while explaining carefully what should be done in emergencies.

CHARLES H. KEENE

Survey of Public Health Nursing—

By the N.O.P.H.N. New York: The Commonwealth Fund, 1934. 250 pp. Price, \$2.00.

There are 5,000 organizations in this country giving public health nursing service and nearly 20,000 public health nurses engaged in various phases of the program. Livingston Farrand says in the foreword of this volume that public health nursing has proved its value in the public health program, and the object of the present survey is to increase its effectiveness.

It is interesting to see that two official organizations, boards of health, and school boards, and one unofficial one, public health nursing associations, employ the bulk of public health nurses.

One waxes more curious as he reads on to see how the quality of public health nursing sponsored by these three organizations differs or compares.

Already at the Biennial Convention in Washington the school nursing section of the N.O.P.H.N. showed unusual signs of activity at the report that supervision of the health of the school child ranks poorest in quality of all activities of the public health nurse as shown in this study. All of us public health nurses were jolted out of our complacency to learn that under the limelight our teaching ability is not up to par.

Here is a chance for us to stand off and view ourselves impersonally for the good of our souls. And others who read will see why they need to stand behind us all the more solidly to help us train ourselves so that our weaknesses will be ironed out and our strong points reinforced.

There are rifts in the clouds, too, for the official agencies for the study showed they actually were doing some types of nursing better than the private public health nursing organizations.

But we must not reveal the whole content of the *Survey*, for it should be widely read and studied for far reaching improvements in our profession are likely to come because of it.

EVA F. MACDOUGALL

Cholera. A Manual for the Medical Profession in China—By *Wu Lien-Teh, Director, National Quarantine Service, J. W. H. Chun, Senior Quarantine Officer, National Quarantine Service, R. Pollitzer, Microbiologist, National Quarantine Service, and C. Y. Wu, Senior Quarantine Officer, National Quarantine Service. Shanghai, China: National Quarantine Service, 1934. Price, Cloth, \$3.00; Paper, \$2.50—post free.*

This most useful book is divided into four parts: Part I, Historical, Geo-

graphical and Epidemiological Aspects, by Wu Lien-Teh; Part II, Laboratory Aspects, by R. Pollitzer; Part III, Clinical Aspects, by J. W. H. Chun; and Part IV, Education and Propaganda, by C. Y. Wu. In addition, there is an appendix by C. Y. Wu on The Spread and Control of Sea-Borne Cholera.

As the title implies, this book has been written as a manual for the medical profession in China. It contains a large amount of useful information. The historical material by Dr. Wu is particularly interesting, but the other writers have given us excellent material describing the methods carried out in China against this disease which was only a short time ago a world menace.

A good index adds to the value of the volume. We must pay tribute to the activities of Dr. Wu, the Director of the National Quarantine Service, when we consider the number of excellent publications which have been pro-

duced during the past few years under exceptionally difficult circumstances.

The printing and binding of the book are excellent. The book can be recommended to all health officers, especially since we have become a world power and since China has been brought within days of our shores by fast steamship travel instead of weeks and months, as was the case only a few years ago.

MAZŮCK P. RAVENEL

Popular Health Science Talks—
Vol. X. Philadelphia: Philadelphia College of Pharmacy and Science, 1933. 307 pp. Price, \$1.00.

This latest volume of an excellent series is distinguished by a fine, brief history of the more spectacular advances in medical research. As in the preceding volumes, the other papers cover a wide range of subjects, all of which will appeal to the sanitarian whose interests reach beyond his own narrow field.

RAYMOND S. PATTERSON

BOOKS RECEIVED

A REVIEW OF NURSING, WITH OUTLINES OF ALL CURRICULUM SUBJECTS AND OBJECTIVE OF NEW-TYPE QUESTIONS. By Helen F. Hansen. Philadelphia: Saunders, 1934. 635 pp. Price, \$3.00.

DISEASES PECULIAR TO CIVILIZED MAN. By George Crile. New York: Macmillan, 1934. 427 pp. Price, \$5.00.

CHILD GUIDANCE CLINICS. A Quarter Century of Development. By George S. Stevenson and Geddes Smith. New York: Commonwealth Fund, 1934. 186 pp. Price, \$1.50.

MODERN DRUG ENCYCLOPEDIA AND THERAPEUTIC GUIDE. By Jacob Gutman. New York: Hoeber, 1934. 1393 pp. Price, \$7.50.

A STUDY OF SCHOOL HEALTH STANDARDS. By Anette M. Phelan. Published by the Author. 1934. 249 pp. Price, \$2.50.

THE SOCIAL ADJUSTMENT OF THE TUBERCU-

LOUS. By Beulah Weldon Burhoe. New York: National Tuberculosis Association, 1934. 55 pp. Price, \$.50.

SEEING AND HUMAN WELFARE. By Matthew Luckiesh. Baltimore: Williams & Wilkins, 1934. 193 pp. Price, \$2.50.

THE ROAD TO ADOLESCENCE. By Joseph Garland. Cambridge: Harvard University Press, 1934. 293 pp. Price, \$2.50.

INDUSTRIAL TOXICOLOGY. By Alice Hamilton. New York: Harper, 1934. 329 pp. Price, \$3.00.

THE NUMBER AND DISTRIBUTION OF SOCIAL WORKERS IN THE UNITED STATES. By Ralph G. Hurlin. New York: Russell Sage Foundation. 1933. 11 pp. Price, \$.10.

THE MEASUREMENT OF SOCIAL STATUS BY THE USE OF THE SOCIAL STATUS SCALE, 1933. By F. Stuart Chapin. Minneapolis: University of Minnesota Press, 1934. 16 pp. Price, \$.25.

A SELECTED PUBLIC HEALTH BIBLIOGRAPHY WITH ANNOTATIONS

RAYMOND S. PATTERSON, PH.D.

Diphtheria Continues Response to Preventive Measures—Diphtheria death rates in large cities continue to decline except in the South where prophylactic immunization has been neglected. As usual, most of the deaths were in children under 5 years.

ANON. Diphtheria Mortality in Large Cities of the United States in 1933. J.A.M.A. 102, 21:1758 (May 26), 1934.

More Credit for Public Health Administration—Typhoid fever mortality rate reduction continues. During 1934 the rate was 1.18, the lowest yet reported for the large cities of the country. This is less than half what it was only 7 years ago.

ANON. Typhoid in the Large Cities of the United States in 1933. J.A.M.A. 102, 20: 1677 (May 19), 1934.

Anti-Tuberculosis Measures Abroad—Five papers about tuberculosis in this British symposium discuss the disease as it affects young women, the relation of dental condition to the progress of tuberculosis, difficulties in early diagnosis, and the conduct of workshops for the tuberculous. Altogether a useful series of papers.

BENTLEY, F. J. *et al.* Pulmonary Tuberculosis in Young Women. J. State Med. 42, 5:249 (May), 1934.

Constipation—Constipation is due more than anything else to irregular toilet habits. After irritating cathartics are discontinued, regularity in eating, exercise, and toilet habits effectually prevents the condition.

BEAURY, A. G. The Treatment of Constipation. New Eng. J. Med. 210, 21:1116 (May 24), 1934.

Better Industrial Health—The frequency of sicknesses causing absence from work of more than a week was less in 1933 than in any year since 1921 when the sickness surveys among industrial employees were first started.

BRUNDAGE, D. K. Incidence of Illness Among Male Industrial Employees in 1933 as Compared with Earlier Years. Pub. Health Rep. 49, 21:615 (May 25), 1934.

Do We Require Too Much Reporting?—Notification is useless in the instances of measles, whooping cough, chicken pox, mumps and influenza, and of little use in scarlet fever and erysipelas. In a well vaccinated population, smallpox notification would be unnecessary. Only in the instances of diphtheria and intestinal infections is it of great value, for in sporadic cases of meningitis, poliomyelitis, encephalitis it cannot be said (by this British epidemiologist) to be of any great importance. Contact control is of value in smallpox, typhoid fever, cerebrospinal fever and tuberculosis; in others, it is useless.

CATTO, H. W. The Changing Outlook on the Control of Infectious Diseases. J. Roy. San. Inst. 54, 11:559 (May), 1934.

Heart Disease in Childhood—It is said that three-quarters of all cases of heart disease develop before the age of 10. The opportunity is great for the school physician to prevent heart disease by the discovery of early signs.

DI PORTE, J. V. Heart Disease Among Children of School Age. New York State J. Med. 34, 10:448 (May 15), 1934.

World Plans Against Cancer—European opinion on the needs for

special organization to further cancer treatment and prevention is summarized by this Swedish authority. He concludes that the best form of propaganda is to have a large number of cured cancer patients.

FORSSELL, G. The Campaign of Society against Cancer (and) Sweden's Anti-Cancer Campaign. *Am. J. Cancer*, 20, 4:848 (Apr.), 1934.

Some Anti-Hookworm Campaign Results—A large sample of the Mississippi population showed a hookworm infestation of 20 per cent as compared with 53 per cent in 1910. During these years, 200,000 people have had hookworm treatment, but despite some sanitary improvements, only one-tenth of the rural homes have adequate sewage disposal.

KELLER, A. E., *et al.* An Investigation of the Incidence and Intensity of Infestation of Hookworm in Mississippi. *Am. J. Hyg.* 19, 3:629 (May), 1934.

Health Insurance Urged Again—What we now spend for that variety of services we think of as medical care would provide better medical services for all below the \$5,000 income level, and better remuneration for the servants if we adopted a perfectly practical scheme of social medicine, says this writer.

KINGSBURY, J. A. Mutualizing Medical Costs. *Survey Graphic*, 23, 6:285 (June), 1934.

Social Medicine for Alberta—The proposal for the Canadian province suggests a per capita fee of \$2.01 per month for employees, and \$2.82 for

others who are heads of families, the fund to provide medical, dental, nursing and hospital services for everyone.

MCGUGAN, A. C. Alberta State Health Insurance Report. *Canad. Pub. Health J.* 25, 4:155 (Apr.), 1934.

All About Silicosis—Causes, symptoms and prevention of silicosis are presented briefly and clearly in this excellent review of the subject.

SAYERS, R. R. Silicosis. *Pub. Health Rep.* 49, 20:595 (May 18), 1934.

The Vitamins Fail in Their Duties—In a British community in which the diets were grossly deficient in vitamins A and D, concentrates were given to controlled groups. The rate of growth in the treated group was only slightly better than the control and there was no indication of any effect upon resistance to infection.

SUTHERLAND, R. Vitamins A and D: Their Relation to Growth and Resistance to Disease. *Brit. M. J.* 3826:791 (May 5), 1934.

Fomites and Disease Spread—Epidemiologic study of a British epidemic of combined diphtheria and scarlet fever convinces the author that second-hand clothing sales had no effect, no milk-borne infection was discovered, but that many cases came from overcrowded, insanitary slum dwellings. Just how much of a factor the insanitary conditions constitute the authors do not reveal. The question of fleeting contacts is raised but not answered.

WILSON, J. G. The Spread of Infectious Diseases. *J. Roy. San. Inst.* 54, 11:553 (May), 1934.

PRELIMINARY PROGRAM OF THE SIXTY-THIRD ANNUAL MEETING AMERICAN PUBLIC HEALTH ASSOCIATION

PASADENA, CALIF., SEPTEMBER 3-6, 1934

THE Annual Meeting Program Committee presents the preliminary program of the scientific sessions of the Sixty-third Annual Meeting of the American Public Health Association and Information concerning meetings of related organizations.

The program of the Third Institute on Health Education to be held August 31, September 1, 2 and 3 will be found on page 796.

Since the following program cannot be considered definite in every respect now, delegates are urged to consult the Final Program, available at the Registration Desk in the Maryland Hotel at the time of the meeting.

Monday, 9:30 A.M.

HEALTH OFFICERS

First Session—Main Hall—Auditorium

SERVING THE PUBLIC FOR HEALTH

Speakers: HENRY F. VAUGHAN, DR.P.H., Health Commissioner, Detroit, Mich., and Member of Board, W. K. Kellogg Foundation, Battle Creek, Mich., and J. L. POMEROY, M.D., Health Officer, Los Angeles County Department of Health, Los Angeles, Calif.

Discussion. WALTER L. BIERPING, M.D., State Health Commissioner, Des Moines, Ia., JOHN J. SIPPY, M.D., District Health Officer, San Joaquin Local Health District, Stockton, Calif., and WARREN F. DRAPER, M.D., State Health Commissioner, Richmond, Va.

PUBLIC HEALTH ENGINEERING

First Session—Gold Room—Maryland Hotel

WATER SUPPLY AND TREATMENT

Pasadena's Water Supply and the Los Angeles Metropolitan Water District.
S. B. MORRIS, Chief Engineer, Water Department, Pasadena, Calif.

Chlorination of the Los Angeles Water Supply. Speaker to be selected.

Contamination of Water Supplies with Oil Well Brines. EARNEST BOYCE, Director, Division of Sanitation, State Board of Health, Lawrence, Kans.

Sanitation of Mountain Playgrounds with Respect to Contamination of Streams.
C. G. GUTTERILL, Chief Engineer, State Department of Health, Berkeley, Calif.

Reclaiming Acid Streams. Speaker to be selected.

Monday, 9:30 A.M.

FOOD AND NUTRITION

First Session—Main Dining Room—Maryland Hotel

Effect of Economic Changes on the Nutrition of a People. ALONZO E. TAYLOR, Director, Food Research Institute, Stanford University, Calif.

The Nutritional Aspects of Milk Pasteurization. Professor E. V. MCCOLLUM, Johns Hopkins University, Baltimore, Md.

The Public Health Aspect of the Relation of Diet to Dental Health. NINA SIMMONDS, PH.D., University of California, San Francisco, Calif.

Discussion. GUY S. MILLBERRY, D.D.S., Dean, College of Dentistry, University of California, San Francisco, Calif.

Fluorine and Its Relation to Public Health. FLOYD DEEDS, PH.D., Bureau of Chemistry and Soils, U. S. Department of Agriculture, San Francisco, Calif.

Report of the Committee on Nutritional Problems. *Chairman,* D. BREESE JONES, PH.D., Bureau of Chemistry and Soils, U. S. Department of Agriculture, Washington, D. C.

The Nutritive Value of Dried Fruits. AGNES FAY MORGAN, PH.D., Department of Household Science, University of California, Berkeley, Calif.

Use of Dinitrophenol in Nutritional Disorders. MAURICE L. TAINTER, Associate Professor of Pharmacology, and WINDSOR C. CUTTING, Resident in Medicine, Stanford University School of Medicine, San Francisco, Calif.

Discussion. P. J. HANZLIK, M.D., Department of Pharmacology, Stanford University School of Medicine, San Francisco, Calif.

CHILD HYGIENE

First Session—Assembly Room—Auditorium

PROBLEMS OF THE SCHOOL CHILD

Report of School Health Studies. DONALD B. ARMSTRONG, M.D., Third Vice-President, Metropolitan Life Insurance Company, New York, N. Y.

Practical Application of Principles of School Health Research. HAROLD H. MITCHELL, M.D., School Health Service, Freeport, N. Y.

Discussion. ALVIN POWELL, M.D., Oakland, Calif.

Mental Hygiene as a School Problem. FORREST ANDERSON, M.D., Director, Los Angeles and Pasadena Child Guidance Clinic, Los Angeles, Calif.

Discussion. OLGA BRIDGMAN, M.D., Psychiatrist, University of California Medical School, San Francisco, Calif.

The Value of the Fluoroscope in Case Finding Among Children. HAROLD FELLOWS, M.D., Assistant Medical Director, Metropolitan Life Insurance Company, New York, N. Y.

Discussion. MERLE PINDELL, M.D., Los Angeles County Health Department, Los Angeles, and ROBERT S. STONE, M.D., Associate Professor of Roentgenology, University of California Medical School, San Francisco, Calif.

Health Problems in Rural Schools. HELEN HEFFERNAN, Chief, Division of Elementary Education and Rural Schools, Sacramento, Calif.

Discussion.

Monday, 9:30 A.M.

PUBLIC HEALTH NURSING SECTION AND AMERICAN SOCIAL HYGIENE ASSOCIATION

Joint Session—Ball Room—Huntington Hotel

THE PART OF THE PUBLIC HEALTH NURSE IN THE EPIDEMIOLOGY OF SYPHILIS

Presiding: ELENORA THOMSON, Professor of Public Health Nursing, University of Oregon, Portland, Ore., and PEARL McIVER, R.N., *Chairman*, Public Health Nursing Section, U. S. Public Health Service, Washington, D. C.

When and How Is Syphilis Communicable and How Rendered Non-Infectious? WALTER CLARKE, M.D., American Social Hygiene Association, New York, N. Y.

What Powers and Responsibilities Have Health Authorities to Prevent the Spread of Syphilis? J. ROSSLYN EARP, M.D., Director, Bureau of Public Health, Department of Public Welfare, Santa Fe, N. Mex.

Case Finding and Case Holding Activities of Public Health Nurses in Relation to Syphilis. Problems and Experiences.

Maternity and Child Health Services. Speaker to be selected.

City Health Department Clinics. Speaker to be selected.

Generalized Public Health Nursing Service in Cities. NAOMI DEUTSCH, R.N., Director of Visiting Nurses, San Francisco, Calif.

General Public Health Nursing Services in Rural Areas. EDITH S. COUNTRYMAN, R.N., Director of Public Health Nursing, State Department of Health, Des Moines, Ia.

Questions and Discussion.

LABORATORY

First Session—Exhibition Hall—Auditorium

Address of the Chairman. ROBERT S. BREED, PH.D., Chief-in-Research, New York State Agricultural Experiment Station, Geneva, N. Y.

Section Business.

Report of the Coördinating Committee on Standard Methods. *Chairman*, A. PARKER HITCHENS, M.D., Major, Medical Corps, U. S. Army, Walter Reed Hospital, Army Medical Center, Washington, D. C.

Report of the Committee on Diagnostic Procedures and Reagents. *Chairman*, W. D. STOWALL, M.D., Director, State Laboratory of Hygiene, Madison, Wis.

Report of the Committee on Examination of Dairy and Food Products. *Chairman*, ROBERT S. BREED, PH.D., Chief-in-Research, New York State Agricultural Experiment Station, Geneva, N. Y.

Report of the Committee on Milk Pasteurization Studies. *Chairman*, ROBERT S. BREED, PH.D.

Report of the Committee on Advisability of Laboratory Examination of Food Handlers. *Chairman*, MERRA CROOKS YOUNG, Associate Director of Laboratories, State Department of Health, Lansing, Mich.

Monday, 9:30 A.M.

LABORATORY (Cont.)

First Session—Exhibition Hall—Auditorium

Report of the Committee on Water Pollution Studies. *Chairman*, JAMES A. NEWLANDS, Henry Souther Engineering Company, Hartford, Conn.

Report of the Committee on Swimming Pool and Bathing Place Waters. W. L. MALLMANN, PH.D., Department of Bacteriology and Hygiene, Michigan State College, East Lansing, Mich.

Report of the Committee on Section Representation on the Governing Council. *Chairman*, FRIEND LEE MICKLE, Director, Bureau of Laboratories, State Department of Health, Hartford, Conn.

Monday, 12:30 P.M.

INDUSTRIAL HYGIENE

Luncheon Session—Grill Room—Maryland Hotel

Report of the Committee on Standard Practices in the Problem of Compensation of Occupational Diseases. *Chairman*, HENRY H. KESSLER, M.D., Department of Labor, Newark, N. J.

Report of the Committee on Pneumoconiosis. *Chairman*, R. R. SAYERS, M.D., Chief Surgeon, U. S. Bureau of Mines, Washington, D. C.

Report of the Committee on Industrial Anthrax. *Chairman*, HENRY F. SMYTH, M.D., University of Pennsylvania, Philadelphia, Pa.

Report of the Committee on Volatile Solvents. *Chairman*, HENRY F. SMYTH, M.D.

Report of the Committee on Skin Irritants. *Chairman*, HENRY F. SMYTH, M.D.

Report of the Committee on Lead Poisoning. *Chairman*, ALBERT S. GRAY, M.D., State Department of Health, Hartford, Conn.

Report of the Committee on Industrial Fatigue. *Chairman*, FREDERICK B. FLINN, Columbia University, New York, N. Y.

The Industrial Hygiene Section, 1914-1934. EMERY R. HAYHURST, M.D., PH.D., Consulting Hygienist, Columbus, O.

PUBLIC HEALTH NURSING

Luncheon Session—Crystal Room—Huntington Hotel

Speaker to be selected.

Monday, 1:00-4:00 P.M.

PUBLIC HEALTH EDUCATION

First Session—Belvedere Gardens, East Side Health and Welfare Center,

Los Angeles County Health Department

A Demonstration of Health Education Methods.

Monday, 2:30 P.M.

LABORATORY

Second Session—Indiana Room—Auditorium

Presiding: MAZYCK P. RAVENEL, M.D., *Vice-Chairman* of the Laboratory Section, University of Missouri, Columbia, Mo.

Approval of Laboratories for Surgical Pathology in New York State. A. B. WADSWORTH, M.D., and RUTH GILBERT, M.D., Division of Laboratories and Research, State Department of Health, Albany, N. Y.

Relapsing Fever Problem of California. GEORGE E. COLEMAN, Research Associate in Medicine, The George Williams Hooper Foundation for Medical Research, University of California, San Francisco, Calif.

Typhus Fever. JAMES G. MCALPINE, PH.D., Director of Laboratories, State Department of Health, Montgomery, Ala.

Rocky Mountain Spotted Fever: Results of Ten Years' Prophylactic Vaccination. R. R. PARKER, PH.D., Special Expert, Officer in Charge, U. S. Public Health Service, Hamilton, Mont.

The Weil-Felix Reaction in Rocky Mountain Spotted Fever and Its Relation to Certain Other Typhus-Like Diseases. GORDON E. DAVIS, SC.D., Bacteriologist, Spotted Fever Laboratory, U. S. Public Health Service, Hamilton, Mont.

Pleo-Antigenicity of *Proteus* X-19. HENRY WELCH, PH.D., Research Microbiologist, FRIEND LEE MICKLE, Director, and EARLE K. BORMAN, Assistant Director, Bureau of Laboratories, State Department of Health, Hartford, Conn.

LABORATORY AND FOOD AND NUTRITION SECTIONS

Joint Session—Main Hall—Auditorium

Presiding: WALTER H. EDDY, PH.D., *Chairman*, Food and Nutrition Section, Teachers College, Columbia University, New York, N. Y., and ROBERT S. BREED, PH.D., *Chairman*, Laboratory Section, Chief-in-Research, New York State Agricultural Experiment Station, Geneva, N. Y.

Report of the Committee on Microbiological Methods of Food Examination. *Chairman*, LAWRENCE H. JAMES, PH.D., Food Research Division, Bureau of Chemistry and Soils, U. S. Department of Agriculture, Washington, D. C.

Processing Fruits and Vegetables in California. J. R. ESTY, PH.D., Director, Western Branch Laboratory, National Canners Association, San Francisco, Calif.

The Results of California's Dairy Control Set-Up. CHARLES U. DUCKWORTH, D.V.M., Assistant Director, Department of Agriculture, Sacramento, Calif.

Methods of Identifying Streptococci in Dairy Products. G. J. HUCKER, PH.D., and P. ARNE HANSEN, New York State Agricultural Experiment Station, Geneva, N. Y.

Mussel Poisoning. H. SOMMER, PH.D., and KARL F. MEYER, M.D., Professor of Bacteriology, The George Williams Hooper Foundation for Medical Research, University of California, San Francisco, Calif.

Home Canning and Public Health. F. W. TANNAP, PH.D., Department of Bacteriology, University of Illinois, Urbana, Ill.

Coli-Aerogenes in Wagon Milk, Raw and Pasteurized. VIVIENNE HUDSON, and H. W. HILL, M.D., D.P.H., Director, Provincial Board of Health Laboratories, Vancouver, B. C.

Monday, 2:30 P.M.

VITAL STATISTICS

First Session—Main Dining Room—Maryland Hotel

Section Business.

Residence Correction (Report of the Committee). *Chairman*, J. V. DEPORTE, PH.D., Director, Division of Vital Statistics, State Department of Health, Albany, N. Y.

Traffic Accidents. H. L. BARLOW, Superintendent of Records and Identification, Department of Police, Los Angeles, Calif.

Trends in the Prevalence of Diphtheria. ESCHSCHOLTZIA L. LUCIA, PH.D., Assistant Professor of Biometry, Department of Hygiene, University of California, Berkeley, and HILDA F. WELKE, Statistician, Division of Vital Statistics, City and County Department of Public Health, San Francisco, Calif.

Variable Factors in Pernicious Anemia. L. R. GATES, D.P.H., Instructor in Hygiene and Public Health, and Sanitarian to Health Service, University of Michigan, Ann Arbor, Mich.

The Cause of Breast Cancer. EMIL BOGEN, M.D., Olive View Sanatorium, Olive View, Calif.

PUBLIC HEALTH ENGINEERING

Second Session—Exhibition Hall—Auditorium

High Temperature Short-Time Pasteurization of Milk. R. E. IRWIN, Milk Plant Engineer, State Department of Health, Harrisburg, Pa. (*Stereopticon Illustration.*)

Discussion. C. S. MUDGE, Associate Professor of Dairy Industry, University of California, College of Agriculture, Davis, Calif.

Relation of Retail Price of Milk to Production Costs. THOMAS PARRAN, JR., M.D., State Health Commissioner, Albany, N. Y.

Sanitary Works Made Beautiful. Speaker to be selected.

Aerial Nuisances and Oil Refineries. Speaker to be selected.

Sanitation in Large Irrigation Districts. Speaker to be selected.

EPIDEMIOLOGY

First Session—Assembly Room—Auditorium

Epidemiological Studies on Relapsing Fever in California. HARLIN L. WYNNS, M.D., Chief, Bureau of Epidemiology, and DOROTHY BECK, Junior Epidemiologist, State Department of Health, San Francisco, Calif. (*Stereopticon Illustration.*)

Some Notes on Typhoid Fever. EDWARD S. GODFREY, JR., M.D., Director, Local Health Administration, State Department of Health, Albany, N. Y. (*Stereopticon Illustration.*)

Observations on Unusual Outbreaks of Epidemic Disease in Rural Areas in Iowa. CARL F. JORDAN, M.D., Epidemiologist, State Department of Health, Des Moines, Ia.

Monday, 2:30 P.M.

EPIDEMIOLOGY (Cont.)

First Session—Assembly Room—Auditorium

Sources and Modes of Infection in Two Family Epidemics of Syphilis. A. L. GRAY, M.D., Epidemiologist, State Board of Health, Jackson, and W. H. CLEVELAND, M.D., Health Officer, Lee County, Miss. (*Stereopticon Illustration.*)

Some Factors in the Epidemiology of Malaria. HENRY HANSON, M.D., State Health Officer, MARK F. BOYD, M.D., Rockefeller Foundation, and T. H. D. GRIFFITHS, U. S. Public Health Service, Jacksonville, Fla.

Monday, 6:30 P.M.

PUBLIC HEALTH EDUCATION

Dinner Session—Grill Room—Maryland Hotel

Closed Session—for Fellows and Members of the Section.

Monday, 8:00 P.M.

FIRST GENERAL SESSION

Main Hall—Auditorium

Invocation. DEAN HARRY BEAL, St. Paul's Cathedral, Los Angeles, Calif.

Addresses of Welcome:

J. D. DUNSHEE, M.D., Chairman of the Pasadena Local Committee.

WILTON L. HALVERSON, M.D., Health Officer, Pasadena, Calif.

E. O. NAY, Chairman, Board of City Directors.

LOUIS L. HENNINGER, M.D., President, Pasadena Branch, Los Angeles County Medical Association.

MRS. PHILIP SCHUYLER DOANE, President, Women's Auxiliary, California State Medical Association.

Address of the President of the American Public Health Association. HAVEN EMERSON, M.D., Department of Public Health Administration, Columbia University, New York, N. Y.

Announcement of Awards.

Tuesday, 9:30 A.M.

INDUSTRIAL HYGIENE

First Session—Gold Room—Maryland Hotel

Address of the Chairman of the Section. R. R. SAYERS, M.D., Chief Surgeon, U. S. Bureau of Mines, Washington, D. C.

Health Hazards in the Oil Industry. R. A. JEWETT, M.D., Medical Director, General Petroleum Corporation of California, Los Angeles, Calif.

Lead Poisoning Statistics for 1933. FREDERICK L. HOFFMAN, LL.D., Consulting Statistician, Prudential Life Insurance Company of America, Philadelphia, Pa.

Tuesday, 9:30 A.M.

HEALTH OFFICERS

Second Session—Dining Room—Maryland Hotel

No Title. ALBERT RAY SOUTHWOOD, M.D., Chairman, Central Board of Health, and Head, Department of Public Health of South Australia, Adelaide, S. Australia.

The Changes That Have Occurred in Twelve of the Most Important Diseases Since 1900. LOUIS I. DUBLIN, PH.D., Third Vice-President and Statistician, Metropolitan Life Insurance Company, New York, N. Y.

Programs and Plans of the Tennessee Valley Authority Medical and Health Section. E. L. BISHOP, M.D., State Commissioner of Public Health, Nashville, Tenn.

Trends in Public Health Nursing. PEARL McIVER, R.N., U. S. Public Health Service, Washington, D. C.

Health Insurance Legislation. Speaker to be selected.

European Health Officers. W. W. PETER, M.D., White Plains, N. Y.

The Plague Situation in California. W. H. KELLOGG, M.D., Chief, Bureau of Laboratories, State Department of Health, Berkeley, Calif.

Rural Health Conservation Contest. CARL E. BUCK, DR.P.H., Field Director, American Public Health Association, New York, N. Y.

LABORATORY AND PUBLIC HEALTH ENGINEERING SECTIONS

Joint Session—Main Hall—Auditorium

Report of the Committee on Examination of Water and Sewage. JOHN F. NORTON, PH.D., The Upjohn Company, Kalamazoo, Mich.

Potability of Water from the Standpoint of Fluorine Content. H. V. SMITH, Assistant Agricultural Chemist, and DR. MARGARET C. SMITH, University of Arizona, Tucson, Ariz.

B. Coli vs. B. Aerogenes. Speaker to be selected.

Bacteriology and Shellfish. Speaker to be selected.

Dysentery-Like Outbreaks Attributed to Water Supplies. Speaker to be selected.

PUBLIC HEALTH EDUCATION AND CHILD HYGIENE SECTIONS

Joint Session—Exhibition Hall—Auditorium

Presiding: WILLIAM P. SHEPARD, M.D., Chairman, Public Health Education Section, Assistant Secretary, Welfare Division, Metropolitan Life Insurance Company, San Francisco, Calif.

The Scope of Health Education in Schools and in the Community at Large and the Activities Through Which It Functions. CLAIR E. TURNER, DR.P.H., Massachusetts Institute of Technology, Cambridge, Mass., MARY P. CONNOLLY, Director, Division of Health Education, Department of Health, Detroit, Mich., and ADELHEID ARSTEN. (Presented by WILLIAM P. SHEPARD, M.D.)

Tuesday, 9:30 A.M.

PUBLIC HEALTH EDUCATION AND CHILD HYGIENE SECTIONS (Cont.)

Joint Session—Exhibition Hall—Auditorium

Should School Medicine and School Nursing Be Chiefly Remedial Services to the Child or an Educational Experience?

For Education. Do: W. GUDAKUNST, M.D., Director of School Health Service, Department of Health, Detroit, Mich.

Tuesday, 12:30 P.M.

DIPHTHERIA IMMUNIZATION

Special Luncheon Session—Ball Room—Huntington Hotel

Participants:

HUNTINGTON WILLIAMS, M.D., Commissioner of Health, Baltimore, Md.

J. N. BAKER, M.D., State Health Officer, Montgomery, Ala.

C. C. YOUNG, D.P.H., Director, Bureau of Laboratories, State Department of Health, Lansing, Mich.

W. T. HARRISON, National Institute of Health, Washington, D. C.

WILLIAM J. BELL, M.B., Deputy Minister of Health, Ottawa, Ont.

WILLIAM H. PARK, M.D., Director, Bureau of Laboratories, Department of Health, New York, N. Y.

Tuesday, 2:30 P.M.

PUBLIC HEALTH ENGINEERING

Third Session—Gold Room—Maryland Hotel

SYMPOSIUM ON MUNICIPAL PUBLIC HEALTH ENGINEERING

Report of the Committee on Municipal Public Health Engineering. *Chairman,* W. H. CARY, Department of Health, Detroit, Mich. (To be presented by title only.)

Amebic Dysentery in Chicago.

Engineering—JOEL I. CONNOLLY, Chief, Bureau of Sanitary Engineering, State Board of Health, Chicago, Ill.

Epidemiology—ARTHUR E. GORMAN, Engineer of Water Purification, Department of Public Works, Chicago, Ill.

Results of an Industrial Hygiene Survey in a Large Industrial City. J. J. BLOOMFIELD, Sanitary Engineer, U. S. Public Health Service, and W. SCOTT JOHNSON, Sanitary Engineer, Department of Health, St. Louis, Mo.

Use and Control of Hydro-Cyanic Acid Gas and Other Toxic Gases in Commercial Fumigation. AIME COURINEAU, Chief Engineer, Department of Health, Montreal, Que., and F. G. LEE, Sanitary Engineer, Department of Health, Detroit, Mich.

Municipal Sanitary Conditions and Residual Typhoid. Speaker to be selected.

Tuesday, 2:30 P.M.

FOOD AND NUTRITION SECTION, CALIFORNIA ASSOCIATION
OF DAIRY AND MILK INSPECTORS, CALIFORNIA DAIRY
INDUSTRIES ASSOCIATION, AND THE
CALIFORNIA DAIRY COUNCIL

Joint Session—Main Hall—Auditorium

Presiding: WALTER H. EDDY, PH.D., *Chairman*, Food and Nutrition Section, Teachers College, Columbia University, New York, N. Y., and H. C. ERIKSEN, President, California Association of Dairy and Milk Inspectors, Health Department, Santa Barbara, Calif.

Address of Welcome to the Food and Nutrition Section. H. C. ERIKSEN.

Response. WALTER H. EDDY, PH.D.

Nutrition and Health and the Price of Milk. JAMES A. TOBEY, DR.P.H., Director, Health Service, The Borden Company, New York, N. Y.

Discussion. J. C. GEIGER, M.D., Health Officer, San Francisco, Calif.

The Rôle of Milk in Diets. W. W. BAUER, M.D., Director, Bureau of Health and Public Instruction, American Medical Association, Chicago, Ill.

Report of the Committee on Milk and Dairy Products. *Chairman*, WILLIAM B. PALMER, Milk Inspection Association of the Oranges and Maplewood, Orange, N. J.

Public Health Regulations, Their Effect upon the Economics of Dairying. SAM H. GREENE, Secretary-Manager, California Dairy Council, San Francisco, Calif.

The Responsibility of the Inspector to the Consumer and the Dairy Industry. O. A. GILGGOILE, Supervisor of Dairy Service, State Department of Agriculture, Sacramento, Calif.

Paper by California Dairy Industries Association. Title and speaker to be selected.

LABORATORY

Third Session—Lecture Room—Auditorium

SYMPOSIUM ON DIAGNOSTIC PROCEDURES AND REAGENTS

Presiding: W. D. STOVALL, M.D., *Chairman*, Committee on Diagnostic Procedures and Reagents, State Laboratory of Hygiene, Madison, Wis.

Significance of Bacteriological Methods in the Diagnosis and Control of Whooping Cough. PEARL KENDRICK, Sc.D., Associate Director, and GRACE ELDERING, Bacteriologist, State Department of Health, Bureau of Laboratories, Western Michigan Division, Grand Rapids, Mich.

Biological Significance of Hemolytic Streptococci in Relation to the Etiology, Control and Treatment of Scarlet Fever and Other Hemolytic Streptococcus Infections. JULIA M. COFFEY, State Laboratory of Hygiene, Albany, N. Y.

The Application of the Neufeld Reaction to the Identification of Types of Pneumococci, with the Use of Antisera for Thirty-two Types. GEORGIA M. COOPER and ANNABEL W. WALTER, Bureau of Laboratories, Department of Health, New York, N. Y.

Laboratory Problems Associated with the Diagnosis and Epidemiological Investigations of Meningococcus Meningitis. SARA E. BRANHAM, M.D., PH.D., Senior Bacteriologist, National Institute of Health, Washington, D. C.

Tuesday, 2:30 P.M.

LABORATORY (Cont.)

Third Session—Lecture Room—Auditorium

Virulence Tests for Typhoid Bacilli and Antibody Relationships in Anti-typhoid Serums. JOHN F. NORTON, PH.D., and JOHN H. DINGLE, Sc.D., The Upjohn Company, Kalamazoo, Mich.

Studies on the Toxicity of Brilliant Green for Certain Bacteria. EDMUND K. KLINE, DR.P.H., Director of Laboratories, Cattaraugus County Department of Health, Olean, N. Y.

PUBLIC HEALTH EDUCATION

Second Session—Exhibition Hall—Auditorium

TECHNICS OF SPECIAL EXPERIENCES

Radio. J. L. POMEROY, M.D., Health Officer, and THEODORE SIERKS, Los Angeles County Health Department, Los Angeles, Calif.

Syndicated Material. NATHAN SENAL, DR.P.H., University of Michigan, Ann Arbor, Mich.

Health Bulletins. PAUL S. FOX, State Bureau of Public Health, Santa Fe, N. M.

Newspapers. WILLIAM F. HIGBY, Executive Secretary, California Tuberculosis Association, San Francisco, Calif.

Lectures and Demonstrations. HARRIET FITZGERALD, Berkeley Public Schools, Berkeley, Calif.

PUBLIC HEALTH ENGINEERING SECTION AND CALIFORNIA ASSOCIATION OF SANITARIANS

Joint Session—Main Dining Room—Maryland Hotel

The Value of Sanitary Inspection to Public Health. Speaker to be selected.

Formation of Sanitary Districts in Recreation Areas. Speaker to be selected.

Sterilization in Eating Houses. Speaker to be selected.

Bottled Beverage and Beer Parlors. Speaker to be selected.

Tuesday, 6:30 P.M.

PUBLIC HEALTH ENGINEERING

Dinner Session—Crystal Room—Huntington Hotel

Annual Engineers' Stag Dinner Party.

FOOD AND NUTRITION

Dinner Session—Gold Room—Maryland Hotel

Closed Session for Fellows and Members of the Section.

Section Business.

Tuesday, 6:30 P.M.

WESTERN BRANCH, A.P.H.A.

Dinner Session—Main Dining Room—Maryland Hotel

Address of the President of the Western Branch. J. L. POMEROY, M.D., Health Officer, Los Angeles County Health Department, Los Angeles, Calif.

Response. HAVEN EMERSON, M.D., President, American Public Health Association, Department of Public Health Administration, Columbia University, New York, N. Y.

Tuesday, 8:00 P.M.

WESTERN BRANCH, A.P.H.A.

General Session—Main Hall—Auditorium

International Relationships in Public Health. DR. RUFUS B. VON KLEINSMID, President, University of Southern California, Los Angeles, Calif.

Wednesday, 9:30 A.M.

VITAL STATISTICS

Second Session—Indiana Room—Auditorium

Section Business.

Postcensal Estimates of Population. C. E. BATSCHELET, Geographer, Bureau of the Census, Washington, D. C.

Current Mortality Releases. STEWART G. THOMPSON, D.P.H., Director, Bureau of Vital Statistics, State Board of Health, Jacksonville, Fla.

The State Registrar and His Filing Problems. FRANCIS D. RHOADS, State Registrar of Vital Statistics, Seattle, Wash.

"Public Enemies" of Vital Statistics, in Consideration of the Provisions of the "Model Law." SHELDON L. HOWARD, Registrar of Vital Statistics, ELVA E. GORE, Assistant Registrar, and ROBERT H. WOODRUFF, M.D., Medical Assistant, State Department of Public Health, Springfield, Ill.

Accident Fatalities, 1933 (Report of the Committee on Accident Statistics). *Chairman*, W. THURBER FALES, Sc.D., Director, Bureau of Vital Statistics, State Department of Public Health, Montgomery, Ala.

INDUSTRIAL HYGIENE

Second Session—Lecture Room—Auditorium

Death Rates by Occupation. JESSAMINE S. WHITNEY, Statistician, National Tuberculosis Association, New York, N. Y.

SYMPOSIUM ON HEALTH HAZARDS IN THE SMELTING AND REFINING INDUSTRIES

Speakers and papers to be selected.

Wednesday, 9:30 A.M.

CHILD HYGIENE

Second Session—Crystal Room, Huntington Hotel

MATERNAL AND INFANT HYGIENE

What Can We Learn from Child Health Conditions in Europe? RICHARD A. BOLT, M.D., Director, Cleveland Child Health Association, Cleveland, O.

Discussion. WALTER H. BROWN, M.D., Professor of Hygiene, Stanford University, Palo Alto, and WILLIAM PALMER LUCAS, M.D., San Francisco, Calif.

The Maternal and Infant Problems of the Mexicans Residing in the Southwest. OLIVE B. CORDUA, M.D., Director, Division of Child Hygiene, City and County of San Diego, San Diego, Calif.

Discussion.

The Prenatal Clinic as a Routine Procedure of a County Health Department. N. C. KNIGHT, M.D., Sunflower County Health Department, Indianola, Miss.

Discussion. C. J. VAUGHN, M.D., Lexington, Miss.

Hawaiian Achievements in Child Health. PHILIP S. PLATT, PH.D., Director, Palama Settlement, Honolulu, T. H.

Discussion. GUY S. MILLBERRY, D.D.S., Dean, College of Dentistry, University of California, San Francisco, Calif.

Birth Control as a Public Health Problem. NADINA D. KAVINOKY, M.D., Director of Mothers' Clinics, Los Angeles County Health Department, Los Angeles, Calif.

Discussion. ANNA E. RUDE, M.D., Director, Bureau of Maternal and Child Hygiene, Los Angeles County Health Department, Los Angeles, Calif.

The Reduction of Maternal and Infant Mortality in Rural Areas. J. H. MASON KNOX, M.D., Chief, Bureau of Child Hygiene, State Department of Health, Baltimore, Md.

PUBLIC HEALTH NURSING

First Session—Assembly Room—Auditorium

Report of the Committee on Historical Review and Restatement of Objectives of the Public Health Nursing Section. *Chairman*, MARGUERITE WALES, R.N., General Director, Henry Street Visiting Nurse Service, New York, N. Y.

Report of the Committee on Membership and Stimulation of Fellowship in the Public Health Nursing Section. *Chairman*, ALMA HAUPT, R.N., Associate Director, National Organization for Public Health Nursing, New York, N. Y.

Report of the Committee to Study Nursing Services in State Health Departments in Coöperation with the National Organization for Public Health Nursing. *Chairman*, MARION SNEELHAN, Director, Division of Public Health Nursing, State Department of Health, Albany, N. Y.

Section Business.

Medical Advisory Committees for Public Health Nursing Services. *Speaker to be selected.*

Discussion.

Wednesday, 9:30 A.M.

EPIDEMIOLOGY

Second Session—Gold Room—Maryland Hotel

Report on a Scarlet Fever Epidemic with Special Reference to Missed and Atypical Cases. GEORGE H. RAMSEY, M.D., Director, Division of Communicable Diseases, State Department of Health, Albany, N. Y. (*Stereopticon Illustration.*)

The Reaction of Familial Contacts to Scarlet Fever Infection. J. E. GORDON, M.D., Medical Director, Division of Epidemiology, G. F. BADGER, Associate Epidemiologist, Department of Health, Detroit, and GEORGE B. DARLING, D.P.H., Associate Director, W. K. Kellogg Foundation, Battle Creek, Mich. (*Stereopticon Illustration.*)

Observations on Thirteen Years' Work of Diphtheria Immunization with Special Reference to Immunizing Children Under the Age of Six Months in Central New York and the Value of the Subsequent Schick Test. FREDERICK W. SEARS, M.D., District State Health Officer, Syracuse, N. Y. (*Stereopticon Illustration.*)

Diphtheria Morbidity and Mortality in Racial Groups in the United States. C. C. DAUER, M.D., Instructor of Preventive Medicine, Tulane University, New Orleans, La. (*Stereopticon Illustration.*)

An Outbreak of Milk Poisoning Due to a Toxin Producing Staphylococcus Which Was Found in the Udders of Two Cows. J. A. CRABTREE, M.D., Director, Division of Preventable Diseases, and WILLIAM LITTERER, M.D., Director of Laboratories, State Department of Health, Nashville, Tenn. (*Stereopticon Illustration.*)

HEALTH OFFICERS AND PUBLIC HEALTH EDUCATION

Joint Session—Main Hall—Auditorium

Presiding: WILLIAM P. SHEPARD, M.D., *Chairman*, Public Health Education Section, and Assistant Secretary, Welfare Division, Metropolitan Life Insurance Company, San Francisco, Calif.

Selling Health Department Members First on Health Education. HUNTINGTON WILLIAMS, M.D., Commissioner of Health, Baltimore, Md.

Discussion. JEAN V. LATIMER, Educational Secretary, Massachusetts Tuberculosis League, Boston, Mass.

The Technic of Selling the Health Department to the Public. K. W. GRIMLEY, Director of Health Education and Publicity, Jefferson County Board of Health, Birmingham, Ala.

Discussion. LEON BANOV, M.D., Health Officer, Charleston, S. C.

Wednesday, 12:30 P.M.

HEALTH OFFICERS

Luncheon Session—Main Dining Room—Maryland Hotel

?	?	?	?
Answer!	Answer!	Answer!	Answer!
COME AND FIND OUT!			

Wednesday, 12:30 P.M.

HEALTH OFFICERS (Cont.)

Luncheon Session—Main Dining Room—Maryland Hotel

Presiding: JOHN L. RICE, M.D., Commissioner of Health, New York, N. Y.

At the Answer Table will be found:

- J. N. BAKER, M.D., State Health Officer, Montgomery, Ala.
- HERMAN N. BUNDESEN, M.D., Commissioner of Health, Chicago, Ill.
- A. J. CHESLEY, M.D., State Health Officer, St. Paul, Minn.
- J. D. DUNSHEE, M.D., State Health Officer, Sacramento, Calif.
- J. C. GEIGER, M.D., Health Officer, San Francisco, Calif.
- JOHN P. KOEHLER, M.D., Health Commissioner, Milwaukee, Wis.
- THOMAS PARRAN, JR., M.D., State Health Commissioner, Albany, N. Y.
- JAMES ROBERTS, M.D., Medical Officer of Health, Hamilton, Ont.

Wednesday, 7:00 P.M.

SECOND GENERAL SESSION

Ball Room—Huntington Hotel

The Concern of the United States with Tropical Diseases. F. W. O'CONNOR, M.R.C.S., Associate Professor of Medicine, Columbia University, New York, N. Y.

Dancing.

Thursday, 9:30 A.M.

PUBLIC HEALTH NURSING

Second Session—Gold Room—Maryland Hotel

WHAT QUALITIES MAKE FOR SUCCESS IN A PUBLIC HEALTH NURSE

A Panel Session.

Foreman of the Jury: C.-E. A. WINSLOW, DR.P.H., Professor of Public Health, Yale University, New Haven, Conn.

Jurymen:

Director of a Public Health Nursing Service—Speaker to be selected.

A Course Director—MARY J. DUNN, R.N., Professor of Public Health Nursing, Vanderbilt University, School of Nursing, Nashville, Tenn.

A Superintendent of Schools—EDWIN LEE, Superintendent of Public Schools, San Francisco, Calif.

A Supervising Nurse—ANNA M. NEUKOM, R.N., Supervisor of School Nurses, State Education Department, Albany, N. Y.

A Layman—MARGARET B. HALE, President, Visiting Nurse Association of Pasadena, Ltd., Pasadena, Calif.

A Health Officer—WARREN F. DOWDLE, M.D., State Health Commissioner, Richmond, Va.

Thursday, 9:30 A.M.

LABORATORY AND EPIDEMIOLOGY SECTIONS

Joint Session—Main Hall—Auditorium

SYMPOSIUM ON AMEBIC DYSENTERY

Clinical Amebiasis with Reference to Public Health. ALFRED C. REED, M.D., Professor of Tropical Medicine, University of California, San Francisco, Calif.

The Epidemiology of Amebic Dysentery. J. C. GEIGER, M.D., Health Officer, San Francisco, Calif.

Laboratory Diagnosis of Amebic Dysentery. KARL F. MEYER, M.D., Professor of Bacteriology, The George Williams Hooper Foundation for Medical Research, University of California, San Francisco, Calif. (*Stereopticon Illustration.*)

PUBLIC HEALTH ENGINEERING SECTION AND CALIFORNIA SEWAGE WORKS ASSOCIATION

Joint Session—Ball Room—Huntington Hotel

Influence of Public Works Administration on Sanitary Works Construction. Speaker to be selected.

Experiences with Sewage Farming in Southwest United States. V. M. EHLERS, Sanitary Engineer, State Board of Health, Austin, Tex., and F. C. ROBERTS, JR., State Sanitary Engineer, Phoenix, Ariz.

Reuse of Water for Industrial, Agricultural and Commercial Purposes. Speaker to be selected.

Present Status of Sea Outfalls and Ocean Disposal in the East and the West. Speaker to be selected.

Patents and Sewage Treatment Processes. Speaker to be selected.

Disposal of Wastes from:

Brewing—A. M. BUSWELL, Chief, State Water Survey Division, Urbana, Ill.

Wineries—F. E. DEMARTINI, JR., Sanitary Engineer, State Department of Public Health, Berkeley, Calif.

PUBLIC HEALTH EDUCATION

Third Session—Exhibition Hall—Auditorium

A Digest of Material Presented to Other Sections Which Is of Special Interest to Health Education Workers. IRA V. HISCOCK, Professor of Public Health, Yale University, New Haven, Conn.

Thursday, 12:30 P.M.

PUBLIC HEALTH EDUCATION

Luncheon Session—Main Dining Room—Maryland Hotel

A Discussion of Publicity Material Shown in the Health Education Exhibit. EVART G. ROUTZAHN, Russell Sage Foundation, New York, N. Y.

Thursday, 12:30 P.M.

CHILD HYGIENE

Luncheon Session—Crystal Room—Huntington Hotel

THE CHILDREN'S HOUR

Presiding: ELLEN STADTMULLER, M.D., Director, Bureau of Child Hygiene, State Department of Health, San Francisco, Calif.

Guests of Honor:

- THOMAS PARRAN, JR., M.D., State Health Commissioner, Albany, N. Y.
 KENDALL EMERSON, M.D., Managing Director, National Tuberculosis Association, and Executive Secretary, American Public Health Association, New York, N. Y.
 E. L. BISHOP, M.D., State Commissioner of Public Health, Nashville, Tenn.
 J. D. DUNSHEE, M.D., State Health Officer, Sacramento, Calif.
 JOHN L. RICE, M.D., Commissioner of Health, New York, N. Y.
 JOHN A. FERRELL, M.D., Associate Director, International Health Division, The Rockefeller Foundation, New York, N. Y.
 J. L. POMEROY, M.D., Health Officer, Los Angeles County Health Department, Los Angeles, Calif.
 DON W. GUDAKUNST, M.D., Director of School Health Service, Department of Health, Detroit, Mich.
 GUY S. MILLBERRY, D.D.S., Dean, College of Dentistry, University of California, San Francisco, Calif.
 A. J. CHESLEY, M.D., State Health Officer, St. Paul, Minn.
 WILLIAM PALMER LUCAS, M.D., San Francisco, Calif.
 GEORGE T. PALMER, D.P.H., Assistant to the Health Commissioner, Department of Health, New York, N. Y.
 HAVEN EMERSON, M.D., Department of Public Health Administration, Columbia University, New York, N. Y.

Thursday, 2:30 P.M.

INDUSTRIAL HYGIENE

Third Session—Main Dining Room—Maryland Hotel

- Air Conditioning and Industrial Health. LEVERETT D. BRISTOL, M.D., DR.P.H., Health Director, American Telephone and Telegraph Company, New York, N. Y.
 Occupational Hazards in the Agricultural Industries. ROBERT T. LEGGE, M.D., Professor of Hygiene and University Physician, University of California, Berkeley, Calif.
 A Study of Silicosis in 106 Pottery Workers. PAUL A. QUAINANCE, M.D., Chief, Diagnostic Department, Golden State Hospital, Los Angeles, Calif.
 Tuberculosis Control in a Railway Health Insurance Program. PHILIP K. BROWN, M.D., Medical Director, Southern Pacific Hospital, San Francisco, Calif.

PUBLIC HEALTH ENGINEERING

Fourth Session—Exhibition Hall—Auditorium

Reports of Committees.

Thursday, 2:30 P.M.

LABORATORY

Fourth Session—Indiana Room—Auditorium

- A Study of Culture Media Used for Routine Diphtheria Cultures with a Suggested Modification of Loeffler's Blood Serum Medium. ROSS L. LAYBOURN, Bacteriologist in Charge, Public Health Laboratory, State Board of Health, Topeka, Kans.
- Natural Immunity to Diphtheria in an Institution as Measured by the Schick Test and Blood Titration. C. C. YOUNG, D.P.H., Director, and G. D. Cummings, PH.D., Assistant Director, Bureau of Laboratories, State Department of Health, Lansing, Mich.
- Diphtheria Studies II. The Use of Intradermal Injections of Toxin-Toxoid Mixtures in Diphtheria Immunization. W. E. BUNNEY, PH.D., State Department of Health, Lansing, Mich.
- An Acute Epizootic of Septicemic and Pneumonic Plague in Ground Squirrels. W. H. KELLOGG, M.D., Chief, and JOHN F. KESSELL, PH.D., Bureau of Laboratories, Department of Public Health, Berkeley, Calif.
- Dysenteriaes and Diarrheas of Childhood in the Near East. E. W. DENNIS, M.D., Associate Professor of Bacteriology and Parasitology, American University of Beirut, School of Medicine, Beirut, Syria.
- The Epidemiological Value of Isolating Bacteriophage in Outbreaks of Intestinal Infection. ROY F. FEEMSTER, M.D., DR.P.H., Assistant Director. Antitoxin and Vaccine Laboratory, State Department of Health, Boston, Mass.

HEALTH OFFICERS

Third Session—Gold Room—Maryland Hotel

TUBERCULOSIS AS THE HEALTH OFFICER'S OPPORTUNITY

- Epidemiology of Tuberculosis. Speaker to be selected.
- A Modern Set-Up of the Tuberculosis Program in a Health Department. REGINALD H. SMART, M.D., Tuberculosis Division, Los Angeles County Health Department, Los Angeles, Calif.
- Childhood Tuberculosis and What It Means. MARGARET W. BARNARD, M.D., Director, District Health Administration, Department of Health, New York, N. Y.
- The Future Program of the National Tuberculosis Association. KENDALL EMERSON, M.D., Managing Director, National Tuberculosis Association, and Executive Secretary, American Public Health Association, New York, N. Y.
- Discussion. WILLIAM F. HIGBY, Executive Secretary, California Tuberculosis Association, San Francisco, Calif., and JAMES A. CRABTREE, M.D., Director, Division of Preventable Diseases, State Department of Health, Nashville, Tenn.

FOOD AND NUTRITION

Second Session—Assembly Room—Auditorium

- The Evolution of Meat Inspection. GEORGE GORDON, D.V.S., Meat Inspection Bureau, State Department of Health, Sacramento, Calif.

Thursday, 2:30 P.M.

FOOD AND NUTRITION (Cont.)

Second Session—Assembly Room—Auditorium

Public Health Aspects of Dried Foods. PAUL F. NICHOLS, University of California, Berkeley, Calif.

Fluorine Toxicosis, A Public Health Problem. DR. MARGARET CAMMACK SMITH, University of Arizona, Tucson, Ariz.

Health Problems Connected with the Ethylene Treatment of Fruits. E. M. CHACE, Laboratory of Fruit and Vegetable Chemistry, U. S. Department of Agriculture, Los Angeles, Calif.

Salmon Inspection. E. D. CLARK, PH.D., Director, and RAY W. CLOUGH, PH.D., Northwestern Laboratory, National Cannery Association, Seattle, Wash.

Report of Committee on Foods. *Chairman*, CARL R. FELLERS, PH.D., Massachusetts State College, Amherst, Mass.

LABORATORY

Fifth Session—Lecture Room—Auditorium

Further Studies on the Colon Group. EDMUND K. KLINE, DR.P.H., Director of Laboratories, Cattaraugus County Department of Health, Olean, N. Y.

A Study of the Value of Laboratory Examination of Milk Handlers. EARLE K. BORMAN, Assistant Director, FRIEND LEE MICKLE, Director, and D. EVELYN WEST, Chief Microbiologist, Bureau of Laboratories, State Department of Health, Hartford, Conn.

A Solution of the Streptococcus Carrier Problem. C. W. BONYNGE, M.D., Director, Milk Commission of the Los Angeles County Medical Association, Pasadena, Calif.

Statistical and Serological Studies of Correlated Human and Bovine Brucellosis. R. V. STONE, D.V.M., Director, Bureau of Laboratories, Los Angeles County Health Department, Los Angeles, Calif.

The Relation of the Action of Chlorine to Bacterial Death. C. S. MUDGE, Associate Professor of Dairy Industry, University of California, College of Agriculture, Davis, Calif.

THE THIRD INSTITUTE ON HEALTH EDUCATION

August 31, September 1, 2 and 3

Director: IAGO GALDSTON, M.D.

Instructors: IAGO GALDSTON, M.D., CHARLES E. SHEPARD, M.D.,
HERBERT R. STOLTZ, M.D.

HEALTH EDUCATION IN SCHOOLS

In the four didactic sessions, the Round Table and the Summary sessions, students will help formulate:

THE THIRD INSTITUTE ON HEALTH EDUCATION (Cont.)

- A clear definition of the problem of school health education
- A definition of the curricula of the lower, middle and high school grades, as well as the psychologic character and the educational implication of each of the three groups of grades
- An effective technic in school health education
- The proper relationship of the home, the public and the private health organizations to health education in the school
- The relation of commercial organizations to the school health program
- A plan for dealing with the uninvited guest, the sound and unworthy commercial propaganda that worms its way into the school.

Registration fee \$5.00

MEETINGS OF OTHER ORGANIZATIONS

CONFERENCE OF STATE LABORATORY DIRECTORS

Sunday, September 2, 12:30 P.M. Luncheon. University Club.

WESTERN BRANCH, AMERICAN PUBLIC HEALTH ASSOCIATION

Sunday, September 2, 8:30 A.M. Business Meeting. Lecture Hall, Auditorium.

Sunday, September 2, 12:30 P.M. Luncheon. Main Dining Room, Maryland Hotel.

Sunday, September 2, 2:30 P.M. Business Meeting. Lecture Hall, Auditorium.

Tuesday, September 4, 6:30 P.M. Dinner. Main Dining Room, Hotel Maryland. (See page 789.)

Tuesday, September 4, 8:00 P.M. General Session, Main Hall. Auditorium. (See page 789.)

CALIFORNIA ASSOCIATION OF DAIRY AND MILK INSPECTORS

Monday, 2:30 P.M. Hotel Green

Call to Order. H. C. ERIKSEN, President, California Association of Dairy and Milk Inspectors, Department of Health, Santa Barbara, Calif.

Announcements. ERNEST TEW, Chief Inspector, and *Chairman*, Committee on Arrangements and Entertainment, Department of Health, Pasadena, Calif.

Address of Welcome. Speaker to be selected.

Response. H. C. ERIKSEN, President, California Association of Dairy and Milk Inspectors.

Reports of Standing Committees—Legislation, Milk Plant Practice, Dairy Farm Methods, Dairy and Milk Plant Equipment, Laboratory Methods, Publicity, Resolutions and Public Relations, Membership Committee.

Adjournment to attend the Joint Session of the Laboratory and Food and Nutrition Sections of the American Public Health Association, Main Hall, Auditorium.

CALIFORNIA ASSOCIATION OF DAIRY AND MILK INSPECTORS (Cont.)

Tuesday, 9:30 A.M. Hotel Green

Business

President's Announcements

Report of the Secretary-Treasurer

Report of the Association's Magazine "The Milk Inspector"

Election of Officers

Discussion of Future Policy of "The Milk Inspector"

Round Table Discussion

Tuesday, 11:45 A.M.-1:30 P.M.

Barbecue at the Supreme Dairy Farm. Members of the Food and Nutrition Section of the American Public Health Association are invited.

Tuesday, 2:30 P.M.

Joint session with the Food and Nutrition Section, the California Association of Dairy Industries and the California Dairy Council. (See page 787.)

Wednesday, 9:30 A.M. Hotel Green

Standard Milk Ordinances of the United States Public Health Service and Its Operation. **LESLIE C. FRANK**, Sanitary Engineer, U. S. Public Health Service, Washington, D. C.

No Title. **DR. J. J. FREY**, Golden State Company, San Francisco, Calif.

No Title. **DR. C. L. ROADHOUSE**, State College of Agriculture, Davis, Calif.

AMERICAN SOCIAL HYGIENE ASSOCIATION

Monday, 9:30 A.M. Ball Room, Huntington Hotel. Joint Session with the Public Health Nursing Section. (See page 780.)

MUNICIPAL SANITATION, EDITORIAL COMMITTEE

Monday, 12:30 P.M. Luncheon.

AMERICAN ASSOCIATION OF SCHOOL PHYSICIANS

All persons interested in school health work invited to participate.

Tuesday, 2:00 P.M., Assembly Room, Auditorium.

Greetings from the President. **A. O. DEWEESE, M.D.**, Director, Health and Physical Education, Kent State Normal College, Kent, O.

Aspects of Heart Diseases in School Children. **HENRY H. LISSNER, M.D.**, President, Los Angeles School Heart Board, Los Angeles, Calif.

Discussion. **MAURICE H. ROSENFELD, M.D.**, Cardiologist.

Health Supervision of College Students. **A. O. DEWEESE, M.D.**, Director, Health and Physical Education, Kent State Normal College, Kent, O.

Review of Recent Studies on Poliomyelitis. **BEATRICE HOWITT**, Associate in Research Medicine, The George Williams Hooper Foundation for Medical Research, San Francisco, Calif.

AMERICAN ASSOCIATION OF SCHOOL PHYSICIANS (Cont.)

Exercises for School Children with Heart Disease. SVEN LOKRANTZ, M.D.,
Director of Health, Los Angeles City Schools, Board of Education, Los Angeles,
Calif.

General Discussion on School Health Problems.

ASSOCIATION OF WOMEN IN PUBLIC HEALTH

Monday, 6:30 P.M. Main Dining Room, Maryland Hotel. Dinner.

CALIFORNIA ASSOCIATION OF DAIRY INDUSTRIES

Tuesday, 2:30 P.M. Main Hall, Auditorium. Joint Session with the Food and Nutrition Section, the California Association of Dairy and Milk Inspectors, and the California Dairy Council. (See page 787.)

CALIFORNIA DAIRY COUNCIL

Tuesday, 2:30 P.M. Main Hall, Auditorium. Joint Session with the Food and Nutrition Section, the California Association of Dairy and Milk Inspectors, and the California Association of Dairy Industries. (See page 787.)

CALIFORNIA ASSOCIATION OF SANITARIANS

Tuesday, 2:30 P.M. Main Dining Room, Maryland Hotel. Joint Session with the Public Health Engineering Section. (See page 788.)

JOHNS HOPKINS ALUMNI

Wednesday, 8:00 A.M. Grill Room, Maryland Hotel. Breakfast.

HARVARD UNIVERSITY ALUMNI

Wednesday, 8:00 A.M. Main Dining Room, Maryland Hotel. Breakfast.

DELTA OMEGA

Wednesday, 12:30 P.M. Grill Room, Maryland Hotel. Luncheon.

MASSACHUSETTS INSTITUTE OF TECHNOLOGY ALUMNI

Thursday, 8:00 A.M. Grill Room. Maryland Hotel. Breakfast.

CALIFORNIA SEWAGE WORKS ASSOCIATION

Thursday, 9:30 A.M. Ball Room, Huntington Hotel. Joint session with Public Health Engineering Section. (See page 793.)

ASSOCIATION NEWS

PASADENA AND ALL CALIFORNIA AWAITS YOU

IT has been said that people who have never been to California desire to go there and those who have been to California desire to return. There is a distinct charm in the natural resources of the state and many members of the American Public Health Association are looking forward not only to the Sixty-third Annual Meeting to be held in Pasadena September 3-6, but they are also anticipating visits to world famous outing places and recreational areas in California.

If there be artists among such members, they can find deep inspiration at the Huntington Library in Pasadena, where Gainsboroughs, Romneys, and Turners, as well as other old masters, are represented in one of the most notable collections in the United States. The Palace of the Legion of Honor in San Francisco, located on an eminence overlooking the Pacific Ocean and the Golden Gate, also contains most interesting displays of both ancient and modern art.

Members of the Association who are sportsmen will find excellent golf courses in the vicinity of Pasadena and Los Angeles, as well as all of the other larger cities of the state. Deep sea fishing can be had off the southern California coast and many varieties of game trout are found in the mountain lakes and streams of the state. Those who enjoy swimming and water sports will find all facilities for ocean bathing at the beaches, coast resorts, and at Catalina Island.

Visitors who are interested in the early history of California will want to see Sutter's Fort at Sacramento, which was established by Captain John A.

Sutter in 1839, as the first outpost of white civilization in the great interior of California. It was to one of the rooms at this fort that James W. Marshall in January, 1848, brought the first flakes of pure gold which he showed to Sutter. Since that eventful moment, the history of California and the West has proceeded at a furious speed. The fort, now restored to its original state, is maintained as a museum to house a number of priceless relics of pioneer and gold rush days.

Capitol Park, in which is located the State Capitol erected in the 60's, is still one of the most attractive parks in California. It is famed for its remarkable collection of trees, plants, and flowering shrubs.

Students of history may want to visit the old missions, of which there are many in excellent state of preservation. At San Juan Capistrano, effective restorations have been made, making that mission one of the most attractive of all. Others are located in San Gabriel, Santa Barbara, San Luis Obispo, San Miguel, Santa Clara, Monterey, Carmel, San Juan Bautista, and many other localities. In some of these old missions, vestments worn by Father Junipera Serra, who founded the missions, are to be seen. Silken altar cloths, embroidered by nuns in Spanish cloisters, censers of hand-beaten silver wrought by early day Spanish artisans are to be found in some of these old places of worship.

Astronomers, if there be such among the membership, will enjoy a trip to Mount Wilson, where a new largest telescope is in course of construction. At Lick Observatory on

Mount Hamilton, near San Jose, excellent facilities are also provided for star-gazers.

Those who are in a hurry will find fast airplanes that will take them from city to city almost anywhere along the Pacific Coast.

The National parks maintained by the U. S. Forest Service will attract many to California. The Yosemite, General Grant, Sequoia, and Lassen Volcanic national parks are outstanding places of interest. The beauties of the Yosemite Valley have been described and pictured until they have become well known to almost everyone who reads. Nevertheless, a visit to this valley provides a most pleasurable realization. John Muir has made this valley famous in his books and those who anticipate going to Yosemite should read his description.

Persons interested in nature study should read, particularly, Muir's chapter on the water ouzel, one of the most interesting of all birds. It builds its nest at the water's edge under the spray of a waterfall. Although its feet are not webbed, it dives into the clear cold fast-running streams for part of its food supplies. In flying it always follows the water course, never cutting across a bend in the stream but following the water always. The water ouzel is continually in motion, always singing, and is unquestionably one of the most interesting of all birds. Nature lovers should plan to visit Yosemite, to see the water ouzel in its natural habitat.

The Sequoia National Park has thousands of the Sequoia gigantea, the oldest and largest living things on earth. The size of these trees is unbelievable. No imaginative process can conceive of their gigantic proportions. Their bark is of the radiant cinnamon red color and they tower into the sky to amazing heights. From both Yosemite, Sequoia, and General Grant

national parks pack trips can be made into the high Sierras. These can be 1 day, 3 day, or 7 day trips, and they cover some of the most interesting mountain scenery in the world—snow-capped peaks, glaciers, mountain lakes, and roaring streams. The Mount Lassen National Park is famous for its volcanic peak, the only active volcano in continental United States. Trips can be made to the very summit and in this volcanic region, with its cinder cones, boiling lakes and devils' kitchen of vari-colored boiling mud pots, there is great fascination.

A colorful place is Agua Caliente, across the Mexican border from San Diego. Here there is a huge casino and modern hotel. It is a little Monte Carlo where good food can be obtained in attractive surroundings. Close by is Tia Juana, sordid but interesting because of its real Mexican atmosphere. San Diego itself is a most charming city. Its public parks are magnificent and its climate is delightful. Here Ramona's home, made famous by Helen Hunt Jackson, can be visited. Extending all over California are magnificent highways, most of which belong to the state highway system. They are kept in excellent repair and provide easy access to all places of interest. Members of the Association who drive their own cars to California can anticipate a great treat in driving over these smooth concrete ribbons.

Los Angeles and San Francisco provide every attribute for metropolitan entertainment, good food, and luxurious hotels. Rates are low now, and there are ample opportunities for keen enjoyment of the cosmopolitan life that is found in both of these large cities.

In San Francisco, engineers will marvel at the two enormous bridges now under construction. One will span the Golden Gate and the other will cross the San Francisco Bay from Oakland to San Francisco. Millions are

being spent in their construction, and novel engineering methods employed.

Within walking distance of the hotels in San Francisco is that cluster of steep-pitched streets where the largest colony of Chinese, outside of China, lives its own life. Here the shops, the smells, the sounds, even the architecture, suddenly become truly Oriental; strange music issues from theatres where stars from Canton and Shanghai appear. Wise globe-trotters save their money for San Francisco's Chinatown. In its many gay bazaars are bargains not to be matched in the treaty ports of China itself, and you will like the Chinese flappers, dainty, chic, strange blend of exotic East and Western smartness. Of particular interest to visitors are the

joss houses; the telephone exchange, where calls are made by name, necessitating the memorizing by Chinese girl operators of more than 2,000 subscribers' names; the jewelers at work on the side streets; and the newspapers which are composed by hand from thousands of pieces of type, each representing a sign word.

Californians await opportunities to play hosts to Association members from other states. Full facilities for recreation and entertainment are available, and health officers in all parts of the state are ready to assist all visitors to the September meeting in finding the type of recreation indicated by their individual taste. We invite you to partake of our western hospitality.

OF SCIENTIFIC INTEREST IN PASADENA

THE Pasadena Local Committee is offering to the members of the American Public Health Association an opportunity in September to visit many places of outstanding importance in scientific endeavor. Following are only some of the many places public health workers will find of special interest.

LOS ANGELES COUNTY HOSPITAL

On April 15, 1934, the New Acute Unit Building of the Los Angeles County Hospital was dedicated. This building was erected at a cost of approximately \$13,000,000 and is devoted to the care of acutely ill indigent residents of Los Angeles County. Communicable diseases and psychopathic cases are not treated in this building.

The building contains no ward having more than 8 beds. The typical visiting unit contains 28 beds, divided into four 6-bed wards, one 2-bed ward, and two 1-bed wards. Twelve hundred beds from these wards can be wheeled on to roof areas without elevator transporta-

tion. The building has a normal working capacity of 2,444 and an ultimate capacity of 3,600 beds. The two top-most floors are reserved for emergency epidemics or disasters.

The building has two independent water supplies from different reservoirs and four independent electrical services from widely separated plants. It is connected into two separate sewer lines.

The unit is of steel frame with floors and walls of reinforced concrete. It contains 20 stories, the largest of which is the main floor containing 186,200 square feet. There are 16,500,000 cubic feet in the building and it is earthquake proof. It contains more than 5,000 hollow metal doors, more than 2,700 hollow metal cabinets and 5,400 lockers. It has more than 35 miles of travertite base. A total of more than 600,000 sacks of cement was used in the 90,000 cubic yards of concrete which the building contains. Electric, plumbing, and heating contracts called for 108 miles of electric

conduits, 720 miles of wire and cables, and 250 miles of pipe lines. More than 38,000 keys are ticketed and filed in the key filing cases. There were 620,000 square yards of plastering used, of which 85,000 square yards is acoustical plaster. Sixty per cent of the wall and ceiling surfaces in the wards were plastered with this plaster. This compares with 15 per cent sound-proofed surfaces in other hospitals.

More than 16,000 meals a day can be served in the building from a central kitchen. Every patient is served at his bed from food carts which are set up in the central kitchen and returned with trays to a central dish-washing plant. One hundred food carts, each capable of carrying 36 trays, are garaged and serviced in the central kitchen.

HEALTH CENTERS

The new Alhambra Health Center, one of the most recently constructed of the Los Angeles County Health Centers, is regarded as a remarkable example of a modern solution to the health and welfare problems of an area. The Health Center Plan, originated by the Los Angeles County Health Department in 1924, aims to provide a number of completely equipped and staffed institutions located at strategic points in the county to obviate long distance transportation to a main health office for clinical, medical, health educational, or emergency service.

The Alhambra Health Center, located approximately 4 miles south of Pasadena and 8 miles northeast of the Hall of Justice, Los Angeles, is constructed along the California-Spanish lines of architecture—white stucco walls, 2-story, tile roof—a cheery departure from conventional style in public medical buildings. Its equipment comprises X-ray for tuberculosis diagnosis, special dental apparatus for preventive dentistry among school children, eye-ear-nose-throat instruments for physical

examination, orthopedic apparatus including large tile pool for poliomyelitis cases, emergency operating rooms and equipment with adjoining wards and kitchen, metabolism and cardiology instruments used in prenatal work, laboratory, fluoroscope, venereal disease equipment, and many other types of apparatus specially designed and arranged from a public health standpoint rather than that of a medical institution. Maternal and child hygiene conferences meet regularly at the Health Center. Headquarters for the local district staff of health officers, sanitary inspectors, public health nurses, and social service workers are maintained in the building.

The East Side Health and Welfare Center, located 7 miles east of Los Angeles, is mother of the chain of health centers extending throughout Los Angeles County. Its equipment and staff are organized in the same way as those of the Alhambra institution. The East Side building is unique in the fact that it serves what is believed to be the largest unincorporated area in the United States—a population of approximately 100,000 in an area of 40 square miles. Central administrative offices of the County Health Department's bureaus of nursing, child hygiene, and sanitation are housed in this building, due to lack of space at central headquarters in Los Angeles.

PSITTACOSIS LABORATORY

The U. S. Public Health Service, in the late fall of 1932, established in Pasadena a Psittacosis Laboratory under the direction of Senior Surgeon H. E. Hasseltine. The purpose of this laboratory is for the study and control of the disease, psittacosis. The laboratory also coöperates with physicians and health officers throughout the country in establishing the diagnosis of this disease in birds and in human cases. The building which the laboratory occupies

was formerly the Isolation Hospital, and was kindly loaned to the Public Health Service by the City of Pasadena.

SEWAGE DISPOSAL PLANT OF PASADENA

The continued and increasing interest, not only on the part of sanitary engineers but also by the general public, in the question of complete and sanitary disposal of municipal sewage, warrants a visit to the Tri-City sewage treatment plant serving the cities of Pasadena, Alhambra, South Pasadena, and San Marino, a combined population of about 124,000. This plant has been in continuous operation since 1924 and at the present time is treating an average annual flow of approximately 3 billion gallons and producing organic fertilizer as a by-product. The activated sludge process is conceded to be the most efficient method, from the results obtained, for the disposal of sewage.

The effluent or water from the sedimentation tanks is very clear, and the reduction in bacteria is 99 per cent plus. Raw sewage contains approximately 5 million bacteria per c.c. The effluent from the sedimentation tanks contains approximately 200,000 bacteria per c.c. The reduction of solids is 90 to 95 per cent. In order that the effluent may be still further purified bacterially, so as to render it harmless before it leaves the plant, it is chlorinated, thereby reducing the bacteria to not more than 300 per c.c. The requirements of the California State Board of Health permit 10,000 colonies per c.c.

Disposition of the excess sludge has been the principal problem connected with all sewage disposal. Pasadena has solved the problem by converting a nuisance into a valuable and increasingly popular fertilizer known as "Nitroganic." The annual production is approximately 3,000 tons, or about 1 ton of dried commercial fertilizer per million gallons of sewage, or about 50

pounds of dried fertilizer per annum per unit of population served. The material is sterile and does not and cannot transmit disease. This is evidenced by the fact that while the process has been going on for more than 7 years, no case of infection or vocational illness has been experienced by the plant operatives. This, however, is not surprising, since the fertilizer consists of totally new chemical compounds, formed by the treatment to which it has been exposed.

BEVERLY HILLS WATER TREATMENT PLANT

This modern water treatment plant is housed in a beautiful building befitting the surroundings. The primary object of the plant is to rid well water supply of sulphur and iron and their microorganisms; beggiatoa and crenothrix, the sulphur and iron algae or bacteria and also manganese bacteria which imparted bad taste and odor to water.

W. K. KELLOGG RADIATION LABORATORY

During the past few years, high voltage roentgen-ray equipment has been made available, for clinical purposes, which operates satisfactorily at potentials of 600 kv. or higher. Apparatus of this type was first constructed 3 years ago by Lauritsen and his co-workers at the California Institute of Technology. The physical, biological, and clinical factors pertaining to such apparatus seem to be of increasing interest to the roentgen therapist. Up to September 25, 1933, clinical experience at the California Institute had been limited to 285 patients. Only inoperable cases are accepted.

The equipment used was designed and constructed by Lauritsen and his associates at the W. K. Kellogg Laboratory. The high potential source consists of 2 transformers, each rated at 750 kv. root-mean-square at 30 ma., and therefore each is able to operate at a peak voltage of 1,000,000. One trans-

former is on the bridge and the other is in the pit of the laboratory. The middle portion of the tube is grounded and one of the transformers is connected to each end of the tube. The tube itself is 30 feet long and protrudes through the treatment room. It is constructed of glass cylinders protected internally with steel shields. A gold target is situated at the lower end of the upper electrode.

MT. WILSON OBSERVATORY

Located on the summit of mile-high Mt. Wilson, the Mt. Wilson Observatory of the Carnegie Institution of Washington, D. C., is regarded as the world's foremost center of astronomical research. The world's largest telescope is in-

cluded in its equipment. Aside from the observatory, the summit affords an inspiring view of the San Gabriel Valley and the Coast line beyond.

DAIRIES

For those interested, visits are also being arranged to prominent dairies and dairy plants in southern California, showing modern methods of milk control, production, etc.

GENERAL INTERESTS

In addition to the foregoing, plans are being made for registrants to avail themselves of the opportunity of visiting many other places of general interest.

MAKE YOUR RESERVATION EARLY

.....(*Cut off on this line and mail to the hotel of your choice—See p. 806*).....

HOTEL RESERVATION BLANK FOR PASADENA MEETING AMERICAN PUBLIC HEALTH ASSOCIATION

50 WEST 50TH STREET, NEW YORK, N. Y.

SEPTEMBER 3-6, 1934

To
(Name of Hotel)

Please reserve for merooms for.....persons
for the A.P.H.A. Meeting.

Single room.....Double room.....
Bungalow for persons

Maximum rate per day for room \$.....Minimum rate per day for room \$.....

I expect to arrive..... If date of arrival is changed I will notify
you at least 24 hours in advance.

Please acknowledge this reservation.

Name
Street address
City..... State.....

PASADENA HOTEL RATES

The Maryland Hotel and Bungalows

(Capacity, 375 Rooms)

Single room, with bath, \$3.50-\$4.00
 Single room, without bath, \$2.50
 Double room, with bath, \$5.00
 Double room, without bath, \$4.00
 Bungalow rooms at same prices as Main Building rooms, \$4.00 additional for living room.

The bungalows vary in size, and consist of a living room and anywhere from 2 to 5 bedrooms, either with private bath or connecting bath, and these would make ideal arrangements for groups that would be congenial together.

Hotel Vista del Arroyo and Bungalows

(Capacity, 400 Rooms)

Single room, with bath, \$4.50
 Double room, with bath, \$6.00-\$7.50

The Huntington Hotel and Bungalows

(Capacity, 292 Rooms)

Single room, with bath, \$4.50
 Double room, with bath, \$6.00-\$7.50
 2 Single rooms, with bath, \$7.00
 Double and single rooms, with bath, \$9.00
 2 Double rooms, with bath, \$10.00

Hotel Green

(Capacity, 167 Rooms)

Single room, with bath, \$2.50
 Double room, with bath, \$3.00-\$3.50
 2 Single rooms, with bath, \$5.00-\$6.00

Hotel Constance

(Capacity, 164 Rooms)

Single room, with bath, \$2.00
 Double room, with bath, \$3.00

NOMINATIONS FOR THE GOVERNING COUNCIL

IN accordance with the By-laws of the Association, the Nominating Committee reports the following nominations for the Governing Council. The Constitution provides that "upon the petition of twenty-five Fellows, the Nominating Committee shall add the name of any Fellow to this list, pro-

viding such petition is received 15 days before the Annual Meeting."

The ten Fellows receiving the highest number of votes on a written ballot cast by the Fellows present and voting at the Annual Meeting in Pasadena will be elected for the three-year term, 1934-1937.

Donald B. Armstrong, M.D.,
 Metropolitan Life Insurance Co.,
 New York, New York.

Richard A. Bolt, M.D.,
 Director, Cleveland Child Health Dem.,
 Cleveland, Ohio

Paul B. Brooks, M.D.,
 Deputy State Health Commissioner,
 Delmar, N. Y.

J. Rodlyn Earp, Dr.P.H.,
 Director, Bureau of Health,
 Santa Fe, New Mexico.

V. M. Ehlers,
 Capitol,
 Austin, Texas.

W. Thurber Fales, Sc.D.,

Director, Bureau of Vital Statistics
 Alabama State Board of Health,
 Montgomery, Alabama.

J. G. Fitzgerald, M.D.,
 University of Toronto,
 School of Hygiene,
 Toronto 5, Canada.

Leslie C. Frank, C.E.,
 U. S. Public Health Service,
 Washington, D. C.

Walter S. Frisbie,
 U. S. Food and Drug Administration,
 Dept. of Agriculture,
 Washington, D. C.

Mary S. Gardner,
 112 N. Main Street,
 Providence, R. I.

Edward S. Godfrey, Jr., M.D.,
New York State Dept. of Health,
Albany, N. Y.

Dr. Alice Hamilton,
Harvard School of Public Health,
55 Van Dyke Street,
Boston, Mass.

C. A. Holmquist,
New York State Dept. of Health,
Albany, N. Y.

Kenneth F. Maxcy, M.D.,
P. O. Box 701,
University, Va.

Prof. E. V. McCollum,
Johns Hopkins University,
615 N. Wolfe Street,
Baltimore, Md.

Guy S. Millberry, D.D.S.,
University of California,
Dental Library,
San Francisco, Calif.

Joseph W. Mountin, M.D.,
U. S. Public Health Service,
Washington, D. C.

Sophie C. Nelson, R.N.,
197 Clarendon Street,
Boston, Mass.

William H. Park, M.D.,
333 E. 68th Street,
New York, N. Y.

Philip S. Platt, Ph.D.,
Director, Palama Settlement,
Honolulu, Hawaii.

C. O. Sappington, M.D.,
330 S. Wells Street,
Chicago, Ill.

R. R. Sayers, M.D.,
6070 Oronow Street,
Alexandria, Va.

William P. Shepard, B.S., M.D.,
600 Stockton Street,
San Francisco, Calif.

W. G. Smillie, M.D.,
Harvard University School of Public Health,
55 Van Dyke Street,
Boston, Mass.

William D. Stovall, M.D.,
State Hygienic Laboratory,
Madison, Wisconsin.

John Sundwall, M.D.,
University of Michigan,
Ann Arbor, Michigan.

George H. Van Buren,
Metropolitan Life Insurance Co.,
New York, New York.

Estella F. Warner, M.D.,
U. S. Public Health Service,
Washington, D. C.

Jessamine S. Whitney, A.B.,
164-16 Cryder's Lane,
Beechhurst, L. I., N. Y.

C. F. Wilinsky, M.D.,
330 Brookline Avenue,
Boston, Mass.

APPLICANTS FOR FELLOWSHIP

HEALTH OFFICERS SECTION

Margaret W. Barnard, M.D., C.P.H., New York, N. Y.

Henry G. Callison, M.D., Augusta, Ga.

Charles W. Decker, M.D., Los Angeles, Calif.

Theodore F. Foster, M.D., M.P.H., West Hartford, Conn.

Don C. Peterson, M.D., C.P.H., Longview, Tex.

George L. Salisbury, M.D., Wickford, R. I.

LABORATORY SECTION

Maurice Brodie, M.D.C.M., New York, N. Y.

Charles F. Craig, M.D., New Orleans, La.

George D. Cummings, Ph.D., Lansing, Mich.

Andrew L. MacNabb, B.V.Sc., Toronto, Ont., Canada

Ralph E. Noble, B.S., Chicago, Ill.

Malcolm H. Soule, Sc.D., Ann Arbor, Mich.

Samuel G. Winter, Ph.D., Dr.P.H., Elmhurst, Ill.

John Wyllie, M.B., B.Sc., D.P.H., Kingston, Ont., Canada

PUBLIC HEALTH ENGINEERING SECTION

Morris M. Cohn, M.S. in C.E., Schenectady, N. Y.

Roy J. Morton, M.S. in C.E., Nashville, Tenn.

INDUSTRIAL HYGIENE SECTION

Paul A. Davis, M.D., Akron, Ohio

Louis Schwartz, M.D., New York, N. Y.

PUBLIC HEALTH EDUCATION SECTION

Antonio Fernos Isern, M.D., Santurce, P. R.

PUBLIC HEALTH NURSING SECTION

Bosse B. Randle, R.N., Grand Rapids, Mich.

EPIDEMIOLOGY SECTION

Gaylord W. Anderson, M.D., Boston, Mass.

John N. Force, M.D., D.P.H., Berkeley, Calif.

Daniel F. Milam, M.D., C.P.H., Raleigh, N. C.

Hans Zinsser, M.D., Boston, Mass.

UNAFFILIATED

Sven Lokrantz, M.D., Los Angeles, Calif.

Felix J. Underwood, M.D., Jackson, Miss.

NEW MEMBERS

The following list includes applicants who have been approved for membership in the A.P.H.A. by the Sub-Committee on Eligibility. These new members have requested affiliation with the sections indicated, and action by the Section Councils will follow.

Health Officers Section

- Lloyd F. Allen, M.D., 44 S. Main St., Pittsford, N. Y., Health Officer
 Carlos Diez del Ciervo, M.D., Avenida Sur 153, Caracas, Venezuela, Public Health Director (Assoc.)
 Thomas J. Danaher, M.D., 55 Main St., Torrington, Conn., Health Officer of Harwinton
 Robert L. Hunter, M.D., Boone County Health Dept., Madison, W. Va., Health Officer
 George E. Johnson, M.D., 5341 Chester Ave., Philadelphia, Pa., Chief, Division of Communicable Diseases, Dept. of Health
 Kenneth B. Moore, M.D., Dept. of Health, Flint, Mich., Assistant Health Officer
 Joseph H. Page, M.D., 1016 Medical Arts Bldg., Houston, Tex., County Health Officer
 Reece M. Pedicord, M.D., City-County Health Dept., Wheeling, W. Va., Health Commissioner
 T. C. Rice, M.D., Franklin, Tenn., Associate Director, Unison County Health Dept.
 Leopold M. Rohr, M.D., 106-25 New York Ave., Jamaica, L. I., N. Y., District Health Officer
 W. Carey Sanford, M.D., Cleveland, Tenn., Director, Bradley County Health Unit
 Madison U. Stoneman, M.D., 280 W. Fifth St., Pomona, Calif., District Health Officer

Laboratory Section

- Sara E. Branham, M.D., Ph.D., National Institute of Health, Washington, D. C., Senior Bacteriologist, U. S. Public Health Service
 Floyd H. Eggert, M.S., Woodworth, Wis., Director, Biological Labs., U. S. Standard Products Co.
 Herbert G. Johnstone, Ph.D., Pacific Institute of Tropical Medicine, Hooper Foundation, San Francisco, Calif., Research Associate in Tropical Medicine
 Louis L. Huestermeyer, M.D., Community Hospital, Newark, N. Y., Bacteriologist in charge, Wyoming County Laboratory
 Jennie Riggs, 701 Cedar St., Nashville, Tenn., Laboratory Technician, State Dept. of Public Health

Vital Statistics Section

- Delmer E. Batcheller, M.A., 613 City Hall, Buffalo, N. Y., Registrar of Vital Statistics

- Robert H. Woodruff, M.D., State Dept. of Public Health, Springfield, Ill., Medical Assistant, Division of Vital Statistics

Public Health Engineering Section

- Mario L. Ferreira, 110 Ferreira Nobre, Rio de Janeiro, Brazil, S. A., Chief Engineer, Federal Laboratory (Assoc.)
 William H. Henning, 1382-20 Ave., San Francisco, Calif., Chief, Division of Plumbing, etc., Dept. of Public Health
 Howard D. Schmidt, B.E., State Dept. of Public Health, Nashville, Tenn., Associate Sanitary Engineer

Industrial Hygiene Section

- Alfred H. Whittaker, M.D., 1394 E. Jefferson, Detroit, Mich., Chairman, Sub-Committee on Public Health, Detroit Board of Commerce

Food and Nutrition Section

- Harry C. Moore, 3716 W. First St., Los Angeles, Calif., Chief, Los Angeles Station, U. S. Food and Drug Administration

Child Hygiene Section

- Wilbur S. Stakes, M.D., 35 Railroad Ave., Patchogue, L. I., N. Y., School Physician

Public Health Education Section

- Paul W. Allen, Ph.D., 344 Forest Hills Blvd., Knoxville, Tenn., Head, Dept. of Bacteriology, University of Tennessee
 Helen E. Charles, 340 N. Oxford, Los Angeles, Calif., School Nurse
 May S. McCormick, P. O. Box 119, Jacksonville, Fla., Executive Secretary, Florida Tuberculosis and Health Assn.
 Grace V. Plum, R.N., P.H.N., San Jose State Teachers College, San Jose, Calif., Instructor and College Nurse
 Leigh E. Sloan, M.D., 317 E. Manchester Ave., Inglewood, Calif., on staff, Dept. of Communicable Diseases, Los Angeles General Hospital

Public Health Nursing Section

- Henrietta M. Adams, R.N., Harborview Hall, Seattle, Wash., Educational Director, Harborview Division, University of Washington School of Nursing
 Mary L. Allen, R.N., State Dept. of Health, Seattle, Wash., Chief, Division of Public Health Nursing and Child Hygiene

Laurene C. Fisher, R.N., P.H.N., Kanawha County Health Office, Charleston, W. Va., Public Health Nurse
 Helen S. Hartley, R.N., P.H.N., 130 S. American St., Stockton, Calif., Supt. of Nurses, San Joaquin Local Health District
 Mrs. Millard Given, Ripley, Tenn., Public Health Nurse
 Carol H. Kidder, A.B., P.H.N., Y.W.C.A., Sacramento, Calif., Public Health Nurse, City Health Dept.
 Rose C. Laning, P.H.N., 6 Bungalow Park, S. Charleston, W. Va., Public Health Nurse
 Mary D. Osborne, R.N., Old Capitol, Jackson, Miss., Associate Director, Public Health Nursing and Child Hygiene
 Katherine Vivian, R.N., 3323 N. Central Ave., Phoenix, Ariz., Maricopa County Health Nurse
 Dorris Weber, R.N., 5475 Cobanne Ave., St. Louis, Mo., Educational Director, Visiting Nurse Assn.

Epidemiology Section

Elliott F. Harrison, M.D., Craig Court, Frank-

lin, Tenn., Chest Clinician, Tuberculosis Division, State Dept. of Health
 Romero Hernan, M.D., M.Sc., Chilean Consulate, 21 West St., New York, N. Y., Student (Assoc.)
 Harold G. Trimble, M.D., 508-16 St., Oakland, Calif., Chief, Tuberculosis Clinics, Oakland Health Center
 Samuel L. Wadley, M.D., C.P.H., 883 N. Barksdale St., Memphis, Tenn., Director, Division of Communicable Diseases, Dept. of Health

Unaffiliated

Franklin Farman, M.D., 727 W. Seventh St., Los Angeles, Calif., Consulting Physician (Assoc.)
 Hugo A. Freund, M.D., 62 Kirby Ave. W., Detroit, Mich., President, Board of Trustees, Children's Fund of Michigan (Assoc.)
 Emmett R. Gahn, 435 E. Henrietta Rd., Rochester, N. Y., Chief, Monroe County Dept. of Sanitation
 Lyell C. Kinney, M.D., 1831-4th Ave., San Diego, Calif. (Assoc.)

DECEASED MEMBERS

George L. Pearson, M.D., Youngstown, O., Elected Member 1920
 D. M. Adams, M.D., Panama City, Fla., Elected Member 1927
 Albert B. Tonkin, M.D., Riverton, Wyo., Elected Member 1932
 William H. Welch, M.D., Baltimore, Md., Elected Member 1917, Fellow 1923
 Florin J. Amrhein, Ph.D., Boston, Mass., Elected Member 1924
 E. W. Kelly, C.E., Duluth, Minn., Elected Member 1930
 Floyd P. Smith, M.D., Trenton, Tenn., Elected Member 1932

What Others Say About Us

(Taken from the Medical Officer—March 31, 1934)

The Year Book of the American Public Health Association (1933-34) was published as a supplement to the AMERICAN JOURNAL OF PUBLIC HEALTH of February, 1934. The association has no exact counterpart in this country, because in Britain the Ministry of Health (or the Department of Health for Scotland) has powers to co-ordinate the health functions of local units, and to fix standards of minimum requirements which are much more extensive than exist in most countries, or than could possibly exist in such countries as France with its "Departments," or the United States with its semi-independent States. We have numberless health associations and societies work-

ing with the object of educating the populace to look after its own health and to demand the State to protect it, and also to advise and influence the State itself, but they are none of them absolutely necessary because the service itself is cohesive and develops from its own experiences. In America this cohesion and interdependence of all local units hardly exists. The Federal Government has certain powers over all the States, the States over the counties, and the counties over the smaller communes, but all these units are in the main independent. The American Public Health Association is the chief body in promoting unity of design and action. It has no power save that of persuasion, but

this in a body so comprehensive and united and so efficiently organized is powerful, if not compelling. In the year book for 1933-34 the association publishes an official declaration of its attitude on the "Standard Minimum Functions and Suitable Organisation of Health Activities" which is worthy of our close study, for it reveals the goal towards which the association is driving, to establish throughout the Republic a uniform system of health activities which in most particulars is similar to our own, and in principle is identical. All experts in preventive medicine have for some years seen that we cannot make the best of our powers over disease, and for the furtherance of health, until the laws and practices of all countries are similar in principle. England was the first to see the essential value of uniformity and to establish it by law in her own country. This undoubtedly redounds to our credit, but we must admit that the nature of our island, and the history of its constitutional system of government, rendered the establishment of a centralised co-ordinated public health service comparatively easy. In America such co-ordination is perhaps more difficult than anywhere else. This the association knows and recognises, but this difficulty has its compensations, for it enables the public health service to value itself. The first two paragraphs of the Declaration bring this out clearly:

The people of North America have for the past five years enjoyed a condition of good health not previously attained for any great population group of diverse races. This is not an accident of good fortune, nor an unearned asset of favourable climate or location.

The consistent continuous use of the medical and associated sciences through civil government is largely responsible for the present high level of health among the people of this continent, their entire freedom from certain pestilential diseases prevalent in former times, and the progressive reduction

in the spread of epidemic disease still commonly experienced.

This is interesting because it appeared about the same time that an eminent authority in England was questioning the essential values of our own public health service.

The American Association insists upon "a full-time trained health officer appointed on professional qualifications and secure against political interference or dismissal during competent performance." The reasons for this are the same as those held in England, not the least of which is that by full-time service alone can the medical officer of health act in concert with private practitioners and not in competition with them. We all know that the building up of a health service is an extremely complicated business, one full of traps in which all who have gone forward have fallen, and from which only those of superior courage or enlightenment have extricated themselves. We, who were first in the field and have generally kept in the van, have made the most mistakes, but whereas our own people are chiefly mindful of our falls, foreigners have been more interested in the ways we have recovered from them, so we can see the English system in its best light by studying the propositions of other countries.

Of the States of the American Union at the present day, many have, in whole or part, magnificent health services, but in others they are poor or hardly existent, and there is much lack of co-ordination. So, though localised epidemics are, in most American communes, worked out eminently satisfactorily both for science and for the protection of the people at risk, great epidemics or pandemics can only be solved in part and indifferently. The outlook for a unified highly efficient health service for the whole of the United States is much brighter today than it ever has been, for the political philosophy of the Americans is tending towards a more complete federation.

NEWS FROM THE FIELD

NATIONAL HOUSING ACT

DR. HAVEN EMERSON, Professor of Public Health at the College of Physicians and Surgeons of Columbia University and President of the American Public Health Association, issued a statement asking all public health officers and physicians generally to support the National Housing Act recommended to Congress by President Roosevelt. Dr. Emerson has been in close touch with the Administration at Washington regarding public health problems growing out of the depression.

As one professionally interested in what the National Housing Act will mean to the health and happiness of the American people, I am alarmed to learn that certain interests are attempting to prevent the passage of this bill at this session of Congress, or at least thoroughly to emasculate it. I am not competent to discuss the financial aspects of this bill and can only imagine that opposition to it might come from persons of the loan-shark turn of mind who would be likely to object to the elimination of a system anywhere under which a home owner would be likely to pay 35 per cent for second mortgage money, a state of affairs which I am authoritatively informed actually exists today in various parts of the United States.

What I am concerned with is the immediate benefits this bill will have if passed at this session of Congress upon the health and morale of the American people as a whole. Considering all sections, cities and towns and the rural districts, some housing conditions in both rural and urban America are but little better than those of the dark ages.

Here are some of the facts regarding American homes:

Even in the colder sections of the country a bare 33⅓ per cent, including apartments and tenements, have central heating. In the rural areas, which include towns of less than 10,000 population, only about one-sixth have plumbing in the house. Homes with running

water are less than one-quarter of the nation's total; homes with electricity are less than one-half. Many American homes, and by this I mean private, single dwellings, and not tenements, are nothing short of fire traps. Twenty-three per cent of all fires start on roofs, and as many as 75 per cent in rural districts. How many homes have fireproof roofs? The average American home is wasteful of heat in winter, because it is not properly insulated, and very uncomfortable in summer for the same reason. Kitchens and bathrooms are too often finished in wood, and hard to keep clean. Not only are there multitudes of homes lacking running water for bath and kitchen and toilet, but there are hundreds of thousands of homes where there is no privy of any kind indoors or out, and there are some thousands of school buildings in Southeastern United States lacking this elementary convenience so essential for health and prevention of communicable disease. Homes hardly more than shacks or shelters throughout the malarial areas of the South lack screens for doors and windows, upon which prevention of mosquito-borne infection depends. In many of our wealthiest cities the priceless privilege of direct and even indirect sunlight is denied to homes in the shadow of tall buildings. Without light the human being suffers as definitely as it does from infectious disease. It sometimes takes a depression or other disaster to make people realize how bad conditions are. In addition to putting some 500,000 to 1,000,000 men to work and removing immediate menaces to American health, I hope that the passage of this bill will awaken the American public to the fact that in housing on an average we are at least a century behind our present achievements in transportation and communication. I hope that health officers and physicians throughout the country will give their support actively to the National Housing Act.

It must be remembered that the National Housing Act is distinctly not a program of government spending. It does not call for a single home to be built or even repaired with government money. The National Housing Act will merely attract private capital into the neglected building field.

THE HOFFMAN LIBRARY FOR CANCER

THE gift of Dr. Frederick L. Hoffman's cancer library, made jointly by the Prudential Insurance Company and Dr. Hoffman, to the Cancer Research Laboratories of the University of Pennsylvania Graduate School of Medicine is a notable event in the medical history of Philadelphia.

The present Research Library of the Cancer Research Laboratories will eventually be combined with the Hoffman Library for Cancer to make a reference library for cancer which will be as unique as it will be valuable. The present Research Library was collected for special use in cancer research and contains 542 books, 459 bound volumes of journals and 7,309 classified reprints, with author and subject reference.

FOODS SPOILAGE BY BLUE LIGHT RAYS

RAYs of light at the blue end of the spectrum are responsible for much of the spoilage of foods commonly termed rancidity, reports Mayne R. Coe, a chemist in the U. S. Department of Agriculture. He states that chlorophyll green wrappers retard the development of this kind of spoilage almost as well as does the total exclusion of light.

CONGRESS OF PHYSICAL THERAPY

THE thirteenth annual scientific and clinical session of the American Congress of Physical Therapy will be held in Philadelphia at the Bellevue Stratford, September 10-13, 1934.

For the preliminary program, address American Congress of Physical Therapy, 30 North Michigan Avenue, Chicago, Ill.

NATIONAL CONGRESS OF PARENTS
AND TEACHERS

AT the 38th Annual Convention of the National Congress of Parents and Teachers held recently in Des

Moines, Ia., Mrs. B. F. Langworthy, of Winnetka, Ill., was elected President, and Mrs. J. K. Pettengill, of Lansing, Mich., was elected 1st Vice-President.

DEATH

GEORGE W. FULLER

GEORGE W. FULLER, of the firm of Fuller & McClintock, 11 Park Place, New York, died on June 15.

Mr. Fuller was President of the American Public Health Association 1928-1929; served on the Executive Board several times, and has been particularly active in the Public Health Engineering Section. He has been a Member since 1915 and was made a Charter Fellow in 1922.

PERSONALS

JAMES A. KENNEDY, M.D., F.A.P.H.A., has resigned as Professor of Bacteriology in the School of Medicine, University of Georgia, in order to accept the associate professorship in Bacteriology in the School of Medicine, University of Louisville, Louisville, Ky., and the directorship of the recently combined Bacteriological and Serological Laboratories of the Louisville City Hospital and Department of Health.

VICTOR MILDENBERG, M.D., Member A.P.H.A., has been appointed Acting Director of the Bureau of Preventable Diseases of the Department of Health of New York City by Commissioner John L. Rice, M.D.

S. BOUCHER, M.D., F.A.P.H.A., Director of Health of Montreal, Quebec, had the honorary degree of LL.D. conferred upon him by McGill University at recent graduation exercises.

THOMAS PARRAN, JR., M.D., Fellow A.P.H.A., New York State Commissioner of Health, received the degree of Doctor of Laws conferred

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Effect of a Confidential Inquiry on the Recorded Mortality from Syphilis and Alcoholism*

A Survey in the Westchester County Health District

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AT a meeting of the Vital Statistics Section of the American Public Health Association in 1932, during a general discussion of the possibility of introducing a confidential form of death certificate in this country, the Westchester County Health District was suggested as a test area in which to try out some such system of reporting deaths. It was apparent that before any system could be introduced, a number of factors needed to be given careful consideration. In the first place, it was essential to determine the attitude of the medical profession toward such a project, not only whether it would cooperate but also if in this country it is reasonable to expect a physician to state the exact and complete cause of death on any official record if a part of the record reflects on the character

of the deceased. In addition to this, it was necessary to obtain some fairly accurate estimate of the extent to which certain diseases are underreported, in order to ascertain whether or not the present system of reporting causes of death is inaccurate enough to justify the effort and time involved in setting up a system of confidential reporting.

With these purposes in view it was decided to attempt a rapid survey in the Westchester County Health District to determine the extent to which alcoholism and syphilis had been underreported as causes of death during a 2 year period. These two causes were chosen, in spite of the fact that the number of deaths attributed to them is not a large proportion of the total mortality, because they are ones in which there is probably a significant amount of underreporting. The death certificates which had been filed with the County Department of Health during the 2 years from July 1, 1931, through June 30,

* Read before the Vital Statistics Section of the American Public Health Association at the Sixty-second Annual Meeting in Indianapolis, Ind., October 9, 1933.

1933, were arranged and listed according to the name of the physician who signed them. The name, age, sex, date of death, and the primary and contributory causes of death which had been stated on the original death certificate were listed for each patient. Dr. William A. Holla, a physician and member of the staff of the County Health Department, who has long been a practising physician in the county, and who knows well the attitudes and problems of his professional confrères, visited each physician with the list of his deaths and asked him to state for each case—first, whether to his knowledge alcoholism or syphilis had been existent conditions at the time of death, and second, in the event that either condition had existed, whether, in the physician's opinion, it was a primary or contributing cause of death.

Alcoholism was defined for the purpose of the study as the habitual use of excessive amounts of alcoholic beverages. In order to assure the physician that no attempt was being made to use the data in such a way as to reveal his identity or that of his patients, the names of the decedents and the dates of death were detached and left with him. The sheet retained by the investigator and used in the following analysis shows only age, sex, originally assigned causes of death, and the newly acquired information.

Before beginning the survey, the proposed plan was outlined in detail to the Comitia Minora of the County Medical Society. This group not only heartily endorsed the project but volunteered to coöperate in every possible way. The president of the society sent a copy of a letter from the County Health Commissioner, which described the procedure to be followed, to every member of the Medical Society with his own letter of endorsement. As a result, the physicians showed the greatest coöperation and were extremely gener-

ous in giving time not only to furnish the desired information but to discuss the whole problem of confidential reporting and its advisability. Some of the local village and city medical societies coöperated by giving an opportunity at their meetings for an open discussion of the project. The results of the survey must, therefore, be considered as a coöperative effort on the part of the medical profession of Westchester County, especially the County Medical Society, and the County Health Department to obtain the most nearly accurate data possible.

The completed survey includes an investigation of 5,299 deaths. The certificates were signed by 365 physicians, each of whom was interviewed with the intention of finding out his reaction to the survey, whether or not he considers a confidential certificate practicable, and what system of reporting would be most satisfactory to him. These physicians comprise a representative professional group. The area in which they practise includes a population of 307,000 distributed in one city of 41,000 population, 5 villages over 10,000 population, 13 villages with from 2,500 to 10,000 population, and 17 rural townships. They included 3 physicians who reported the deaths which occurred in the county hospital, Grasslands, and the county medical examiner. The number of deaths occurring in their practices during the 2 years varied from 1 to 59 with the exception of the hospital physicians and the medical examiner, each of whom signed several hundred certificates.

One hundred and twenty-five of the group of 361 physicians who had deaths recorded among their private patients gave additional confidential information, when interviewed, which was not included on the official death certificate. Of these, 104 had not recorded either syphilis or alcoholism on any of their original certificates.

Although the physicians who gave additional data constituted only about one-third of the total number interviewed, they were those with the largest practices, and the certificates of death which they signed represented about two-thirds of the entire number recorded in private medical practice.

Practically all of the physicians agreed that it would be extremely valuable to devise a system of reporting whereby the exact cause of death could be stated without offense or detriment to the decedent, his family, and the attending physician. In most cases the reason for not stating all essential information relating to the cause of death seems to be that the certificate, before it finally reaches the record files of the State Department of Health, comes under the scrutiny of a local undertaker, a local registrar, his assistants, and other officials who may have access to such records. It is not unreasonable to suppose nor has experience failed to indicate that some of these persons have the human failings of curiosity and gossip. The fact that a death certificate is of access on legal order and that life insurance companies may demand a copy of the record for their purposes does not seem to be nearly so important a factor in promoting incorrect reporting as the element of local interest in fellow citizens.

It was the consensus of the medical profession that physicians would feel far freer to state the true cause of death if this information were sent directly to a central statistical office and did not go through the hands of local residents. Only 6 physicians, or 1.6 per cent, indicated that they disapprove of a confidential certificate, one of these giving as his reason that the present death certificate was adequate and not subject to any great amount of error if other physicians stated the cause or causes of death as accurately as he did. Several refused to discuss the project,

or felt that no system could be devised which would assure them that the data were confidential and would legally remain so under pressure of demands for information from sources which might have a legitimate interest in a specific case. The remainder expressed a definite desire to use a different system of reporting and all have shown an interest in the tentative results of the present survey, some suggesting even that other causes of death, such as cancer and tuberculosis, might have been included in this study to make it of maximum value.

The 5,299 deaths investigated fall automatically into 5 classifications with respect to authority for certification. The largest group, 3,583, were deaths of patients of private physicians practicing in the County Health District; 821 were deaths which occurred in the large county hospital, Grasslands; 621 were signed by the county medical examiner and for this group no additional information could be obtained; 228 were patients in a cancer hospital, Rosary Hill Home, where the certificates were all signed by one physician, in practically all cases the cause of death being cancer. This institution does not include in its records any extensive history of alcoholism and syphilis. Forty-six deaths occurred in Sing Sing Prison, the cause of death in all but 9 being legal electrocution. In the analysis of the effect of confidential reporting on the death rate, these 5 groups must be considered together. Throughout the study, however, the totals have been broken up into the component groups since the data so arranged give convincing evidence to substantiate the opinion that a large error is introduced solely by the physician's professional conviction that his first duty, even in matters involving official record, is to his patient.

Table I shows the actual increase in the number of deaths assigned to

TABLE I-a
DEATHS IN WHICH SYPHILIS* WAS
PRIMARY† CAUSE

Reporting Agency	On Original Certificates	Increase Through Survey	Per cent Increase
All agencies	40	39	97.5
Private Physician	25	28	112.0
Grasslands Hospital	14	11	78.6
Other‡	1	—	—

TABLE I-b
DEATHS IN WHICH ALCOHOLISM** WAS
PRIMARY† CAUSE

Reporting Agency	On Original Certificates	Increase Through Survey	Per cent Increase
All agencies	28	16	57.1
Private Physician	3	16	533.3
Grasslands Hospital	12	—	—
Other‡	13	—	—

* Includes syphilis, tabes dorsalis and general paralysis of the insane

† Classified as primary under rules of Manual of Joint Causes

‡ Includes medical examiner, cancer hospital, and Sing Sing Prison, from whom no additional information was obtained

** Includes alcoholism and alcoholic cirrhosis of the liver

of the physicians would have been recorded together with the additional information.

The number of deaths in the group in which syphilis, including tabes dorsalis and general paralysis of the insane, was a primary cause, increased from 40 to 79, a change of 97.5 per cent in the recorded death rate. Alcoholism or alcoholic cirrhosis of the liver was the original primary cause in 23 cases and the returns of the survey increased the figure to 44 or 57.1 per cent. It will be noted that the increase in the number of deaths from syphilis was considerably greater among physicians' private patients than among hospital patients, the only other group showing any change, and that all of the increase in deaths from alcoholism occurred among the former group. The number of males, among physicians' private patients, who died from syphilis increased from 17 to 33 (94 per cent) and the number of females from 8 to 20 (150 per cent).

The number of deaths from alcoholism and syphilis regularly reported from the hospital is proportionately much higher than in the rest of the county, and in the survey the number of cases in which additional information was obtained was considerably lower. The hospital has a very efficient pathologic service, performing autopsies on over 66 per cent of the deaths, and does not intentionally omit any facts regarding the cause of death on the certificate. The physicians there reviewed all of their cases for the purpose of the study although they felt certain that all essential data had been included on the death certificate. This procedure revealed, however, that syphilis had been omitted in 11 cases where, if it had been stated it would be assigned according to the *Manual of Joint Causes of Death* as the primary cause. In 3 instances the only cause given was aortic insufficiency or thoracic aneurysm, the im-

syphilis and alcoholism together with the percentage change which is also the percentage increase in the death rate. In arriving at these figures the most conservative method of assigning the cause of death was adopted. Only those cases in which the physician stated that syphilis or alcoholism was a primary or contributing cause of death were considered. These were coded according to the *Manual of Joint Causes of Death*, assuming that the original statements

plication of syphilis being so obvious in the mind of the physician that he assumed no further specification of syphilis as the cause was necessary. In the remaining 8 cases, other causes had been given and syphilis omitted even though it had been a definitely contributing factor, the omission being due largely to a tendency to take from the hospital record the final condition re-

sulting in death. These details are of value in showing the error which enters into certification in cases other than those involving personal relationships.

While the increase in the death rate measures the net statistical change resulting when additional data are secured, it does not show, especially in the case of alcoholism, the extent to which information is omitted from the death certificate. Table II shows for each disease the number of cases in which, according to the physician's statement, the cause should have appeared on the certificate and the number in which it was so certified originally. Syphilis as a primary or contributing cause was stated in 49.4 per cent of the cases in which it should have been, and alcoholism in 32.6 per cent. The amount of understatement among physicians' private patients (45.5 per cent of syphilis deaths and only 6.3 per cent of those from alcoholism were so classified on the original certificate) is a very significant element in determining the total figures.

It is of some interest to note the causes of death assigned by the physician in cases where these contributing factors were omitted. Table III shows the primary cause of death originally assigned in such instances. While certain of the leading causes of mortality (chronic nephritis, myocarditis, cerebral hemorrhage, and lobar pneumonia) were stated frequently, the numbers are so small that there would be no significant change in their death rates, even if all of the deaths were assigned to syphilis or alcoholism. The only causes (other than alcoholism and syphilis themselves) which were essentially changed by the facts obtained in the survey are non-alcoholic cirrhosis of the liver and aneurysm. Out of 30 deaths originally attributed to non-alcoholic cirrhosis of the liver, 10 in the physicians' opinion were due to chronic alcoholism and should have been as-

TABLE II-a

DEATHS IN WHICH SYPHILIS* WAS A PRIMARY OR CONTRIBUTING CAUSE

Reporting Agency	On Survey	On Original Certificate	Per cent Reported on Original Certificate
All agencies	81	40	49.4
Private Physician	55	25	45.5
Grasslands Hospital	25	14	56.0
Others†	1	1	100.0

TABLE II-b

DEATHS IN WHICH ALCOHOLISM** WAS A PRIMARY OR CONTRIBUTING CAUSE

Reporting Agency	On Survey	On Original Certificate	Per cent Reported on Original Certificate
All agencies	138	45	32.6
Private Physician	95	6	6.3
Grasslands Hospital	26	22	84.6
Others†	17	17	100.0

* Includes syphilis, tabes dorsalis and general paralysis of insane

† Includes medical examiner, cancer hospital and Sing Sing Prison, from whom no additional information was received

** Includes alcoholism and alcoholic cirrhosis of the liver

TABLE III

PRIMARY CAUSE OF DEATH STATED ON ORIGINAL CERTIFICATE IN CASES
WHERE ALCOHOLISM OR SYPHILIS SHOULD HAVE BEEN INCLUDED

Primary Cause of Death On Original Certificate	Cases in Which Alcoholism Should Have Been Included on Certificate*	Cases in Which Syphilis Should Have Been Included on Certificate*	Cases in Which Primary Cause Was Changed through Survey to Syphilis or Alcoholism	All Cases Surveyed
All causes	93	41	55	5,299
Diseases of the heart	21	11	11	1,136
Acute and chronic nephritis	17	5	7	485
Cerebral hemorrhage, cerebral embolism and thrombosis	10	4	4	362
Cirrhosis of the liver (not specified as alcoholic)	10	3	13	30
Pneumonia, all forms	9	2	2	394
Cancer	5	2	..	764
Pulmonary tuberculosis	4	1	1	252
Aneurysm	..	4	4	9
Other diseases of the circulatory system	4	2	5	152
Diabetes	3	..	..	118
Congenital debility, mal- formations, prematurity and other diseases of early infancy	..	3	3	210
Influenza	2	..	..	43
All other causes†	8	4	5	1,344

* As either primary or secondary cause.

† No specific cause appeared on more than one of the certificates on which syphilis or alcoholism should have been included in the statement of cause of death.

signed to alcoholic cirrhosis of the liver, and 3 were due to syphilis. Out of 9 deaths in the entire group attributed by the original statements to aneurysm, 4 should have been assigned to syphilis.

The method followed in questioning the physicians has made available data which shows the incidence of alcoholism and syphilis among deaths. Table IV

gives the percentages of deaths in which each of these conditions existed for the 5 groups of patients. For the entire group, 1 in 30 males (3.3 per cent) and 1 in 49 females (2.0 per cent) were stated to have had syphilis at the time of death; 1 in 14 males (7.3 per cent) and 1 in 72 females (1.4 per cent) were stated to have been alcoholics.

TABLE IV-a

NUMBERS AND PERCENTAGES OF DECEDENTS WHO WERE STATED TO HAVE HAD SYPHILIS AT THE TIME OF DEATH

	Total Number of Deaths Investigated		Number of Decedents Who Had Syphilis		Percentage of Syphilitics Among Persons Who Died	
	Males	Females	Males	Females	Males	Females
Total	2,790	2,509	93	51	3.3	2.0
Physicians' private patients	1,675	1,908	55	37	3.3	1.9
General hospital patients	497	324	27	14	5.4	4.3
Medical examiner's cases	445	176	1	—	0.2	—
Cancer hospital patients	127	101	—	—	—	—
Prisoners—Sing Sing Prison	46	—	10	—	21.7	—

TABLE IV-b

NUMBERS AND PERCENTAGES OF DECEDENTS WHO WERE STATED TO HAVE BEEN ALCOHOLICS AT THE TIME OF DEATH

	Total Number of Deaths Investigated		Number of Decedents Who Were Alcoholics		Percentage of Alcoholics Among Persons Who Died	
	Males	Females	Males	Females	Males	Females
Total	2,790	2,509	203	35	7.3	1.4
Physicians' private patients	1,675	1,907	162	27	9.7	1.4
General hospital patients	497	324	26	6	5.2	1.9
Medical examiner's cases	445	176	15	2	3.4	1.1
Cancer hospital patients	127	101	—	—	—	—
Prisoners—Sing Sing Prison	46	—	—	—	—	—

SUMMARY

1. The great majority of the 365 physicians reporting deaths in the Westchester County Health District during a 2 year period feel that confidential reporting would result in far greater accuracy in the statement of causes of death than does the present official system.

2. Additional data secured confidentially by personal visit for 5,299 deaths resulted in a death rate from syphilis which is approximately double the recorded mortality and a corrected figure for alcoholism which is 57 per cent higher than the recorded rate.

3. Aneurysm and non-alcoholic cirrhosis of the liver were the only causes of death, other than syphilis and alcoholism, whose death rates were significantly changed by the survey data. The rates for these two causes were each reduced by somewhat more than 40 per cent.

4. Syphilis was stated on the original death certificate as a primary or contributory cause of death in approximately 49 per cent of cases in which it should have been so certified, and alcoholism in 33 per cent.

ACKNOWLEDGMENTS

We wish to express to the Westchester County Medical Society and to the individual practising physicians of the County our appreciation of the coöperation and aid which they have given and on which the entire success of the survey depended. This project was undertaken with the approval of the Council of the Vital Statistics Section of the American Public Health Association and to them we owe thanks for their advice and discussion.

Canadian Public Health Association

PUBLIC Health workers from all parts of the Dominion of Canada met in Montreal during the week of June 11 to attend the Annual Meeting of the Canadian Public Health Association, under the presidency of Dr. Alphonse Lessard, Director of the Quebec Provincial Bureau of Health. The total registration numbered nearly 400 members and guests.

As the Canadian Tuberculosis Association, with Dr. J. A. Couillard as President, was holding its annual meeting at the same time, the programs of the deliberations of the two organizations were arranged to permit several joint sessions.

The presence of Dr. Haven Emerson, President of the American Public Health Association, and of Dr. John A. Ferrell of the Rockefeller Foundation contributed to make the meeting one of

the most successful held in recent years.

A feature of the entertainment program was a dinner tendered by the Province of Quebec and the City of Montreal at which the Hon. A. David, Provincial Secretary, whose ministry includes the Bureau of Health, recounted the recent rapid progress effected in the public health of the Province of Quebec, and Dr. Haven Emerson conveyed to the Canadian Associations the greetings of the American Public Health Association.

The Canadian Tuberculosis Association reelected Dr. J. A. Couillard for President, for the ensuing year. The new President of the Canadian Public Health Association is Dr. F. W. Jackson, of Winnipeg. Dr. Alphonse Lessard, retiring President, was elected an Honorary President of the Association.

A Study of Granite Cutting and Granite Cutters in the Vicinity of New York City

ADELAIDE ROSS SMITH, M.D., F.A.P.H.A.

Division of Industrial Hygiene, New York State Labor Department; Associate in Medicine in Industrial Hygiene, College of Physicians and Surgeons, New York, N. Y.

THIS was a study of 125 men employed in stone yards in and about Greater New York undertaken to determine the extent to which silicosis is present among them. Since the total number of granite cutters in the state is estimated at about 2,000 this represents approximately 6 per cent. This industry in general presents a serious silicosis risk* but, so far, disappointingly little progress has been made in its control. It was thought that any additional evidence of the need for such control which such a study might furnish would be of value in stimulating preventive action. Examination of the men was supplemented with comprehensive dust counts in two representative yards.

The study was a coöperative undertaking on the part of the Division of Industrial Hygiene of the New York State Labor Department, the New York Tuberculosis and Health Association, and the Industrial Health Department of the Metropolitan Life Insurance Company, together with a group of

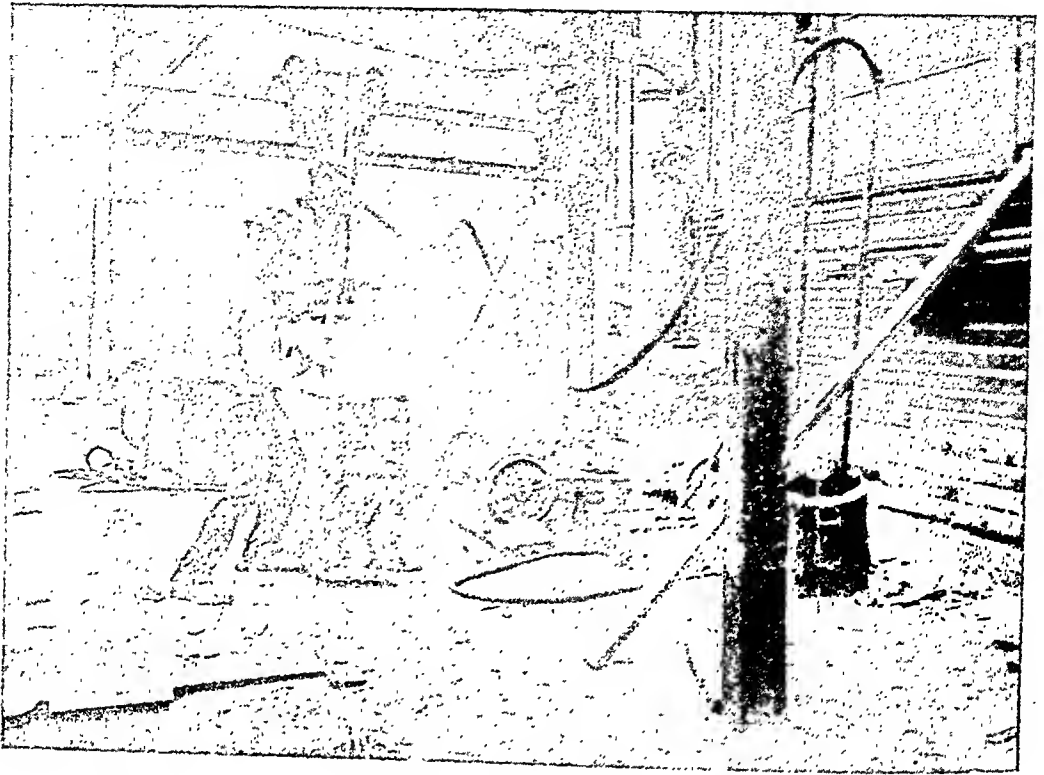
stone yard employers and the local branch of the Granite Cutters International Association. Dr. J. Burns Amberson of the Tuberculosis Service, Bellevue Hospital, read the X-ray films.

GENERAL DESCRIPTION OF THE INDUSTRY

Stone cutting in and about New York City is carried on in some 200 plants, most of them small, employing on an average less than a dozen men each. In normal times work is steady and the men are busy throughout the year. The work is done partially in the open, the sheds as a rule being open on at least one side. Conditions of work thus differ from those in some other states where, on account of more severe winter weather, work is carried on for the most part in enclosed sheds. This difference has been considered by not a few employers about New York City a basis for the belief that stone cutting in this vicinity is less harmful than it is known to be in New England.

All of the men examined worked with granite which because of its durability has to a large extent replaced softer stones such as marble, limestone, and brown stone, for monumental and building purposes. Granite used in New York is shipped from quarries in New England and the West. Its free silica content ranges from about 25 to 35 per cent. It is received in rough blocks

* Studies made by the Public Health Service in Barre, Vt., in 1924-1926 showed that practically all the granite workers had well advanced silicosis after 10 years, while the death rate among them for tuberculosis alone exceeded the death rate for all causes in the general population. Previously, in 1922, Hoffman had emphatically called attention to the high death rates in the industry and commended it particularly to consideration on the part of the state, the medical profession and the labor organizations directly concerned.



Surfacing machine in operation. See dust sample No. 8, Plant A.

which are cut when necessary to the desired size on circular saws using steel grit and water. Carborundum saws with water may be used for trimming. After this preliminary treatment the blocks are suitably finished according to their purpose and destination and it is in the process of producing finishes of various kinds that the dust hazard in this industry occurs.

Finishing is done by surfacing machines and hand pneumatic tools which, about 30 years ago, began to replace the old time hammer and chisel. The surfacing machines are used for large plain surfaces where no design or edging is required. They are essentially pneumatic hammers, the particular size and shape of hammer desired being fitted into a movable arm with a piston operated at the rate of some 5,000 blows per minute. The operation is dry and the amount of dust produced is great, sometimes sufficient to envelop the operator completely.

The hand machines also are operated

by compressed air. The machine is held in the operator's hand and with his face 12 to 18 inches away he guides it over the surface of the stone. Chisels of various sizes are the tools most commonly used in the hand machines. The amount of dust produced by them is considerable and, owing to the proximity of the operator's face, he gets its full effect. In addition to the dust created in operation, operators add materially to the hazard themselves by blowing off dust which has accumulated on the surface of the stone with the exhaust from their tools.

Polishing is usually done with polishing machines using shot, carborundum grains, or felt with water and is not a dusty process. Sometimes, however, small carborundum wheels are attached to the hand tools for polishing smaller stones. This operation is extremely dusty, and wetting the stone which is sometimes resorted to, is entirely ineffective in allaying the dust.

In addition to surfacing, finishing,

and polishing, lettering by means of sandblasting is done in almost all stone yards. A sandblast cabinet is required for the work, but owing to improper maintenance, dust may be found escaping in large quantities and adding to the hazard of those working in the vicinity.

DUST COUNTS IN TWO REPRESENTATIVE YARDS

Studies of the dustiness of representative operations were made in two typical yards, A and B, by W. J. Fehnel of the Industrial Health Department of the Metropolitan Life Insurance Company. The results are given in Tables I and II. The dust sampling and counting were done according to

the standard technic of the U. S. Public Health Service, using the Greenburg-Smith Impinger. Particle size measurements of the dust were made by making micro-photographs under a high dry magnification and further enlarging the negatives by projection. It has been demonstrated repeatedly that no silica particles exceeding 10 microns in greatest diameter enter the lung tissue, and for this reason it is the general practice to consider as hazardous only dust particles under 10 microns. A micron equals one-millionth part of a meter or one-thousandth part of a millimeter. From 98.60 to 99.95 per cent of the particles were found to be less than 10 microns in their greatest diameter.

In the investigation of granite cutting

TABLE I
DUST COUNTS MADE AT PLANT A

Sample No.	Station	Date	Cu. Ft. Air Sampled	Millions of Dust Particles per Cu. Ft. Air Sampled	Millions of Dust Particles, Less than 10 Microns, Per Cu. Ft. Air Sampled	Remarks
1	Alongside No. 1 gang saw	6/22/33	44.0	8.0	7.9	1 man at this operation; saw motor driven; steel shot used as abrasive
2	Hand surfacing	"	35.0	26.0	24.7	Pneumatic tool and hand hammer; 9 point tool
3	Hand polishing	"	9.2	87.0	86.9	Rotor air tool used
4	Hand surfacing	"	15.3	209.0	206.6	4 point tool; 1 man, others close by
5	Hand chipping	"	23.5	44.0	43.6	1 man at this operation
6	Machine polishing	"	42.3	7.0	6.9	1 man at this point; steel shot used as abrasive
7	Polishing mill	"	20.0	10.0	9.9	1 man at this machine
8	Alongside surfacing machine	"	9.4	681.0	663.9	Bush hammer used
9	" "	"	9.4	2,596.0	2,531.1	4 point tool used
10	Between 2 sand blasters	6/27/33	18.8	30.0	29.5	Sandblasters stand outside cabinet

TABLE II
DUST COUNTS MADE AT PLANT B

Sample No.	Station	Date of Sampling	Cu. Ft. Air Sampled	Millions of Dust Particles per Cu. Ft. Air Sampled	Millions of Dust Particles, Less than 10 Microns in Greatest Diameter per Cu. Ft. Air Sampled	Remarks
1	Hand surfacing—split chisel in use	12/5/33	24.0	73.3	70.0	Exhaust from pneumatic tool used to blow dust from stone
2	Hand chipping	"	23.0	82.5	79.2	.....
3	Hand surfacing—4 point tool in use	"	23.0	79.0	75.84	Whisk broom used to brush dust from stone
4	Hand surfacing—split chisel and bush hammer in use	"	40.0	25.0	24.0	Exhaust from pneumatic tool used to blow dust from stone
5	General air in cutting shed of monumental dept.	"	26.0	21.5	20.64	10 men working in this shed, one of whom wears a small respirator which only covers the nose
6	Alongside sandblaster	"	23.4	26.0	24.7	Operator works outside cabinet and enters cabinet to change nozzles; waits only about 2 minutes for dust to settle
7	Machine surfacing—4 point tool	12/6/33	23.4	92.3	91.88	Exhaust applied to these machines; dust exhausted to the outside and rear of the shed
8	Polishing mill	"	31.3	6.9	6.62	1 man; steel shot used as abrasive
9	Alongside circular saw	"	35.0	4.8	4.6	2 men at this point
10	General air of cutting shed, building stone dept.	"	39.0	6.8	6.52	.....
11	Alongside sandblaster in shed in yard	"	27.0	9.9	9.7	Operator works outside cabinet and enters cabinet to change nozzles; waits only about 2 minutes for dust to settle
12	Alongside operator of carborundum saw monumental dept.	"	27.6	4.6	4.41	This machine enclosed in room inside cutting shed of monumental works

plants conducted by the U. S. Public Health Service at Barre,¹ it was found that under conditions pertaining there with granite dust containing 35 per cent of free silica, a safe limit of between 9 and 20 million particles of dust, less than 10 microns in longest diameter, per cu. ft. of air could be established. Workers exposed to this degree of dustiness did not appear to show any increase of respiratory disease. Since at the time of the survey of Plant A only granite was being worked, these findings are directly comparable with those of the Barre study.

It can be seen that the only operations where the dust counts could be considered within the limits of safety were those of gang sawing and polishing, both wet operations. The conspicuously high counts at the surfacing machines were due to the lack of any exhaust devices. These machines at one time had been equipped with exhaust hoods and dust collecting apparatus, but the system had not been operated for some time.

The sandblast cabinet permitted considerable seepage from various small openings at the curtains and around the windows. Dust thus escaping exposed not only the operator but other workmen in the vicinity to high dust concentrations.

It will be noted that the dust counts were considerably lower in Plant B than Plant A. This is attributed to the weather conditions at the time of the tests. Plant A was examined on a clear dry day; Plant B on a damp day with a fine mist in the air. However, in Plant B also the only safe operations were those conducted with water, namely polishing and sawing.

In this plant the six surfacing machines were equipped with individual exhaust systems augmented by directing the exhaust from the tool into the exhaust hood placed at a level with the point of dust generation. The prac-

tice was to discharge the collected dust into a wooden chamber where the heavier dust settled out and the fine, lighter dust was discharged directly into the atmosphere outside the shed. When the wind blew in certain directions this fine lighter dust was blown back into the breathing zone of the workmen at the various operations in the plant.

Sandblasting in this plant was done in two sand blast cabinets but the curtain and screening did not provide an efficient seal against the escape of fine dust, nor were the cyclone separators, used to entrap the dust exhausted from the sand blast cabinets, efficient in entrapping the fine particles.

The particle size distribution studies made in Plant A, showed that more than 90 per cent of particles were 5 microns or less in size in all operations studied but two. In plant B, on the other hand, the number of particles of 5 microns or less in size averaged 75.5 per cent. This tendency to a slightly higher particle size in plant B was also, in all probability, the result of differences in weather conditions at the time tests in the two plants were taken.

EXAMINATION OF MEN

The coöperation of the stone cutters themselves in examinations was secured by explaining the purpose of the study to the men at their union meetings, and those examined represented a purely voluntary group who were accepted as they came without discrimination as to age, length of service or any other consideration.* Each man was interviewed before his examination and a personal and occupational history was taken. The occupational history covered the place and type of work, the number of years engaged in it, the use of pneu-

* The examinations were conducted at the Bellevue Yorkville Clinic through the courtesy of Dr. Margaret Barnard. Dr. Leonard Goldwater, Chief of the Occupational Disease Clinic of New York University and Bellevue Hospital Medical College, kindly lent his assistance.

matic tools, and the presence of ventilating devices. The personal history included a record of age, birth place, past diseases referable to the respiratory tract, of contacts with persons suffering from tuberculosis, and of the presence and details of symptoms associated with respiratory disease.

After the history taking each man received an X-ray examination of his chest. Two exposures were made in each case for spectroscopic examination. The technic was as follows: distance 48 inches, length of exposure $1/10$ seconds, milliamperes 100, voltage varied according to chest thickness.

The physical examination included a record of height, weight, vital capacity, and chest expansion; observation on the presence of clubbing or cyanosis and a physical examination of the chest. Specimens of sputum were sent for examination to the City Board of Health Laboratories in 34 cases. Complete blood counts were made in 20 cases, at the New York State Health Department Laboratories.

In a number of cases where the X-ray examination showed evidence suggestive of tuberculosis which was not confirmed by physical examination or laboratory findings, it was felt that further observation was desirable, and an effort was made to get these men to enter Bellevue Hospital. The effort met with little success, however, since the men did not wish to take time away from work, and less than half a dozen complied. Since the study was made, 2 have been placed under treatment in tuberculosis sanatoria and 1 has died.

CHARACTERISTICS OF GROUP EXAMINED

Nationality—The distribution of the group by nationality is shown below. Italians strongly predominated, constituting 40 per cent of the total. The United States, Sweden, Scotland, Germany, and Ireland furnished another 45 per cent, and the remainder came

from a dozen different countries of Europe and South America.

NATIONALITY OF MEN EXAMINED

<i>Country of Birth</i>	<i>Number</i>	<i>Per Cent</i>
Italy	50	40
United States	16	13
Sweden	14	11
Scotland	11	9
Germany	8	6
Ireland	8	6
Spain	4	3
South America	2	2
Hungary	2	2
Finland	2	2
Other countries	8	6
TOTAL	125	100

Occupation—The occupational classification of workers in these small yards cannot be clear-cut because there is always a good deal of shifting about. Most of the men called themselves cutters, but a cutter may at times operate the surfacing machine or do sandblasting or *vice versa*. Subject to this qualification the occupational distribution is given below.

OCCUPATION OF MEN EXAMINED

<i>Occupation</i>	<i>Number</i>	<i>Per Cent</i>
Cutter	111	88
Sand blaster	6	5
Polisher	4	3
Surfacer	2	2
Sawyer	1	1
Blacksmith	1	1
TOTAL	125	100

All of the cutters with the exception of one reported the use of pneumatic tools for cutting most of the time, and half of them had never done any cutting by hand. Any hand work had been carried on as a rule in the old country before coming to America. About 10 per cent of the men had cut stone exclusively in New York State, the remainder had spent varying amounts of time in stone yards elsewhere, chiefly in New England and the Middle West. The place of work, how-

ever, would seem to have little bearing upon the incidence of silicosis, since the studies of dust concentrations in New York City yards show them to be entirely adequate to produce the disease.

In the experience of these men ventilating devices for hand pneumatic tools were practically nonexistent. Only one cutter reported any exhaust for this type of work. In several instances lack of exhaust ventilation for machine surfacing was mentioned. The use of masks was reported by only two cutters who wore them on their own initiative.

Results of X-ray Examination—Interpretation of the X-ray appearances in this study followed in general the classification suggested by the Silicosis Committee of the American Public Health Association in which first stage appearances are described as generalized arborization throughout both lung fields with more or less small discrete mottling; second stage appearances as generalized medium sized mottling through both lung fields, and third stage appearances as more intense mot-

tling with larger nodules taking on a conglomerate form so that large shadows are shown corresponding to areas of dense fibrosis.

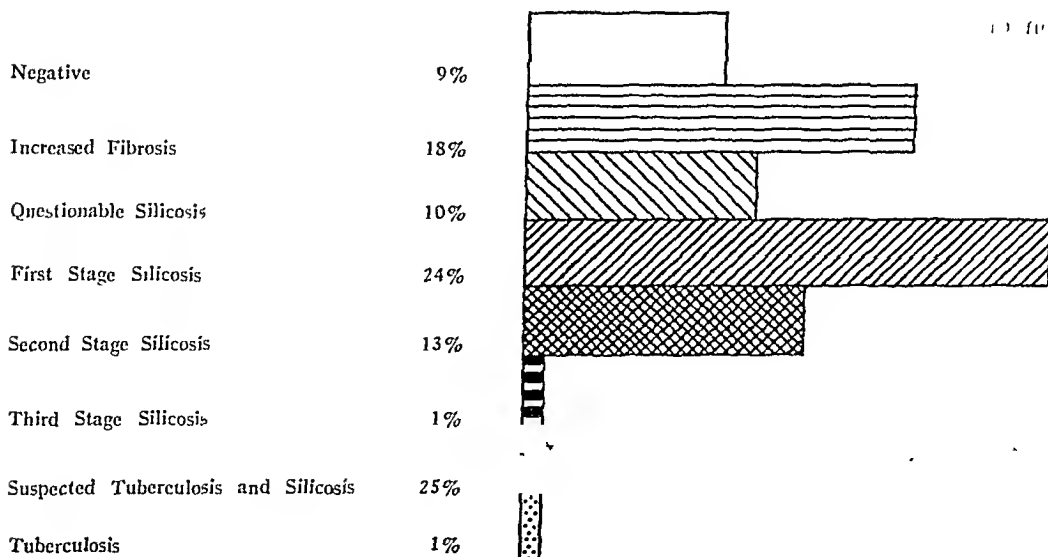
There is always a question as to whether a marked generalized increase in fibrosis without mottling may be indicative of silicosis also. In the classification of silicosis suggested by Pancoast and Pendergrass² a non-nodular type of fibrosis occurring in silicosis is recognized. Thompson³ in his report on silicosis among granite cutters in Barre, Vt., says that mottling was conspicuous by its absence. However, lacking antecedent X-rays to show the development of fibrosis in a previously normal lung after exposure to rock dust, it seems better not to consider cases without at least some nodular fibrosis as silicosis because of the frequency with which generalized fibrosis occurs in lungs when there has been no dust exposure.

The X-ray examination of these men yielded results which are shown graphically in Figure I.

Eleven cases, or 9 per cent, showed

FIGURE I

X-RAY FINDINGS IN GROUP OF 125 GRANITE CUTTERS



essentially negative lungs. In 22 cases or 18 per cent of the total, increased fibrosis was noted. In 13 cases, or 10 per cent, there was increased fibrosis with a question as to whether or not it represented beginning silicosis. Thirty cases, or 24 per cent, showed silicosis in an early stage. Sixteen cases, or 13 per cent, showed second stage silicosis. There was 1 case of simple third stage silicosis, and 1 of apparently early uncomplicated tuberculosis.

TUBERCULOSIS AND SILICOSIS

There were 31 cases or 25 per cent of the total in which signs suggestive of tuberculosis with silicosis were found. In 13 of these the signs were considered to constitute definite evidence of tuberculosis. In 11 the signs were thought to indicate probable and in 7 possible tuberculosis where further study would be necessary for a definite diagnosis.

The silicosis in this group of 31 appeared to be advanced in three-fourths of the cases. The tuberculosis found was uniformly of the chronic fibroid type affecting the apices in every case and involving the bases also in only 4. Definite cavity formation was found in 5 instances. In another 7, small areas of rarefaction were present which may have represented either cavity formation or bullous emphysema.

This apical type of tuberculosis with silicosis is considered by Gardner from his studies of silicotic lungs to represent an early focus which has been reactivated or not permitted to heal under the influence of dust, rather than a new infection occurring at the time of dust inhalation. From the number of apparently latent cases and the relatively good condition of many of those with definite signs, the infection was shown to be mild even if widespread. The type of tuberculosis reported as constituting an outstanding group among the Barre granite cutters, namely that with a sudden onset, rapid course, and predominatingly basal lesions, was not found in this study.

The extent to which tuberculosis figures as a cause of death among granite cutters in this state can be seen from Table III where a comparison is shown of the tuberculosis mortality rates among granite cutters and all adult males in New York for the years 1928 to 1932.

In the tables which follow the total group is presented in sub-division according to the X-ray findings. In the sixth group, "tuberculosis and silicosis," all cases showing either definite, probable, or possible evidence of tuberculosis are included.

Age.—The distribution of the group

TABLE III

TUBERCULOSIS MORTALITY RATES PER 100,000 FOR GRANITE CUTTERS AND ALL MALES 20 YEARS AND OVER IN NEW YORK STATE BY YEARS, 1928-1932 *

Year	Union Membership	No. Deaths from Tuberculosis	Tuberculosis Death Rates per 100,000 Cutters	Tuberculosis Death Rates per 100,000 Males 20 Years and Over
1928	1,357	7	515.8	117.0
1929	1,500	10	666.6	113.2
1930	1,500	12	800.0	107.7
1931	1,500	8	533.3	103.5
1932	1,350	4	296.2	97.6

* Figures are from the records of The Granite Cutters International Association of America and the New York State Dept. of Health, Division of Vital Statistics.

TABLE IV
AGE IN RELATION TO X-RAY FINDINGS

	Negative	Increased Fibrosis	Questionable Silicosis	First Stage Silicosis	Second Stage Silicosis	Tuberculosis and Silicosis	Total Men Examined *
	No. %	No. %	No. %	No. %	No. %	No. %	No. %
Totals	11 100	22 100	13 100	30 100	17 100	31 100	124 100
Yrs.							
Under 25	4 36		1 8				5 4
25-29	3 27	4 18	2 15	2 7		2 6	13 10
30-34	2 18	7 32	1 8	4 13			14 11
35-39		1 4	3 23	5 17	1 6	2 6	12 10
40-44		1 4	3 23	12 40	4 24	6 19	26 21
45-49		3 13	1 8	5 17	1 6	5 16	15 12
50-54	2 18	2 9	1 8	2 7	4 24	8 26	19 15
55-59			1 8		3 18	2 6	6 5
60-64		1 4			2 12	5 16	8 6
65-69		2 9			2 12		4 3
70-74		1 4					1 0.8
75-79						1 3	1 0.8

* In this and the two following tables the 1 case of simple tuberculosis is omitted and the 1 case of simple third stage silicosis is included in the second stage group.

according to age and the relation between age and X-ray findings is shown in Table IV.

The average age in the negative group was 30 years. In the "increased fibrosis," "questionable silicosis," and "first stage silicosis" groups it ranged in the vicinity of 41 years; in the group showing second stage silicosis it was

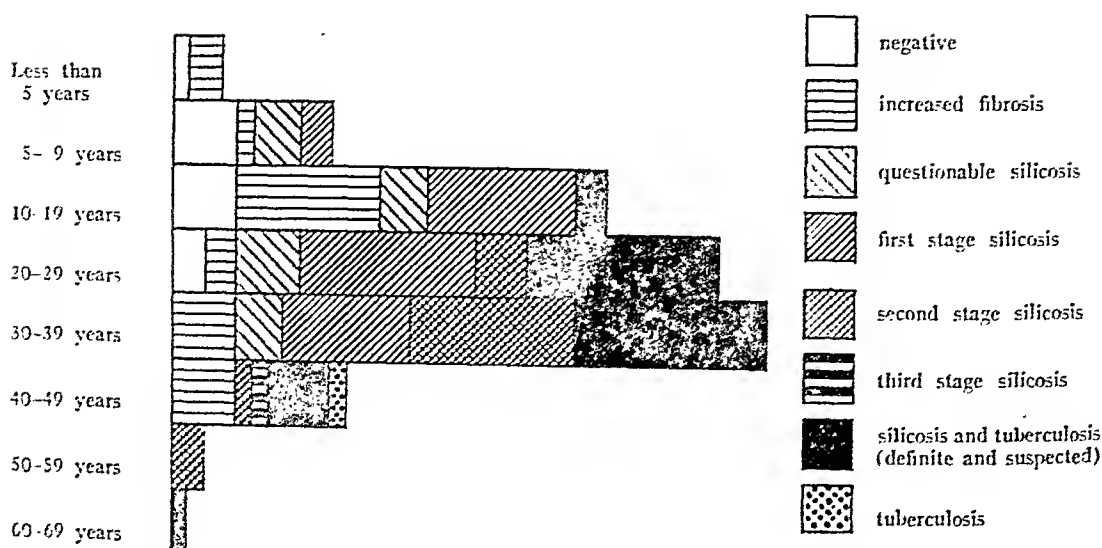
57, and in the group with evidence of tuberculosis and silicosis it was 50 years.

Length of Exposure to Dust—Three of the men examined had been exposed under 5 years; these cases fell in the "negative" and "increased fibrosis" groups. Three had been exposed over 50 years; these cases fell in the "second stage" and "tuberculosis with

TABLE V
LENGTH OF EXPOSURE IN RELATION TO X-RAY FINDINGS

Length of Exposure	Negative	Increased Fibrosis	Questionable Silicosis	First Stage Silicosis	Second Stage Silicosis	Tuberculosis and Silicosis	Total Men Examined
	No. %	No. %	No. %	No. %	No. %	No. %	No. %
Totals	11 100	22 100	13 100	30 100	17 100	31 100	124 100
Yrs.							
Under 5	1 9	2 9					3 2
5-9	4 36	1 4	3 23	2 6			10 8
10-19	4 36	9 38	3 23	9 30		2 6	27 21
20-29	2 18	2 9	4 30	11 36	3 18	12 38	34 27
30-39		4 18	3 23	8 26	10 62	12 38	37 29
40-49		4 18			2 12	4 12	10 8
50-59					2 12		2 2
60-69						1 3	1 1

FIGURE II
X-RAY FINDINGS IN RELATION TO LENGTH OF EXPOSURE



silicosis" groups, as will be seen from Table V. Among the cases showing first stage silicosis, more fell in the 20 to 29 year exposure group than any other, though 2 had been exposed less than 10 years. Among the cases with second stage silicosis more fell in the 30 to 39 year exposure group than in any other. Among those with silicosis and tuberculosis the majority had been exposed from 20 to 39 years. The cases showing "questionable silicosis" were equally distributed over all exposure groups from 5 to 39 years.

The picture given is one of a slowly developing type of silicosis which may show its first stages after anywhere between 5 and 40 years, and tends to become advanced with a marked tendency to be complicated with tuberculosis after 20 years' exposure.

Past History—The history of past respiratory disease revealed a slightly greater frequency of influenza and bronchitis in the group with signs suggestive of tuberculosis and silicosis. This group and the one with second stage silicosis also reported pleurisy with greater frequency than the other groups.

Known contacts with cases of tuberculosis were reported by 4 men, 18 per cent, whose X-rays showed fibrosis; 3, 10 per cent, of those showing first stage silicosis; 1 showing second stage silicosis, and 2, 6 per cent, with evidence of tuberculosis and silicosis.

So far as symptoms and physical signs are concerned this study contributed little to what has been found repeatedly in other similar investigations, unless it be to reemphasize the paucity of both.

Symptoms—Dyspnea was the only symptom clearly related to silicosis. It was reported by 50 per cent of those showing second stage silicosis as compared with 9 per cent in the negative group. Three men were incapacitated for work by it at or shortly after the time of examination. Cough and expectoration were reported with as much frequency by those with increased fibrosis as by those with more advanced changes. Hemoptysis was reported in 3 cases where there was evidence of tuberculosis and 1 case showing increased fibrosis. Six cases out of 17, 37 per cent, with X-ray evidence of second stage silicosis, and 13 out of 31,

TABLE VI

AVERAGE PHYSICAL MEASUREMENTS IN RELATION TO X-RAY FINDINGS

<i>Average Measurements</i>	<i>Negative</i>	<i>Increased Fibrosis</i>	<i>Questionable Early Silicosis</i>	<i>First Stage Silicosis</i>	<i>Second Stage Silicosis</i>	<i>Tuberculosis and Silicosis</i>
Totals	11	22	13	30	17	31
Height (ins.)	66	68	65	66	66	67
Weight (lbs.)	151	164	161	161	175	156
Standard wgt. for age and height	144	148	147	151	156	158
Actual vital capacity (c.c.)	3,810	3,964	3,338	3,737	3,117	3,419
Percentage of normal vital capacity (c.c.)	92	88	80	88	74	80
Chest expansion (cms.)	6	5	5	5	4	4

TABLE VII

VITAL CAPACITY AND X-RAY FINDINGS IN 123 GRANITE CUTTERS

<i>Vital Capacity</i>	<i>Per Cent Normal</i>	<i>Vital Capacity</i>	<i>Per Cent Normal</i>	<i>Vital Capacity</i>	<i>Per Cent Normal</i>	<i>Vital Capacity</i>	<i>Per Cent Normal</i>
<i>Negative</i>				<i>First Stage Silicosis (cont.)</i>			
4,000	99	3,400	86				
4,000	99	4,100	94	3,300	81	2,500	62
3,200	79	3,600	91	3,800	88	3,000	73
3,800	94	4,400	98	4,300	102	2,800	70
3,300	79	4,300	95	4,100	97	4,300	104
		4,100	95	3,400	82	3,800	91
				3,600	87	4,500	107
				3,400	82	3,800	91
				4,000	94	3,800	89
<i>Increased Fibrosis</i>				<i>Second Stage Silicosis</i>			
4,250	103	4,200	99				
4,200	99	3,600	86				
4,200	92	3,600	87				
3,600	83	4,200	100	3,400	85	2,200	54
3,450	84	3,100	76	4,100	98	2,000	48
4,450	104	5,400	118	4,000	91	3,400	81
3,100	75	5,500	124	3,300	79	2,500	62
3,700	83	5,200	122	4,200	94	4,300	97
4,300	102	4,400	95	2,100	53	3,200	72
3,100	74	2,300	57	3,700	87	3,000	71
		3,500	88	3,800	88	3,700	88
						3,000	71
<i>Questionable Silicosis</i>				<i>Tuberculosis with Silicosis</i>			
3,200	74	2,500	64	4,000	93	4,500	98
3,200	84	3,100	72	3,400	76	3,000	74
3,900	92	3,500	83	3,500	80	3,200	75
3,100	76	3,100	75	4,300	100	4,500	100
4,200	97	3,800	94	2,900	68	3,000	74
3,650	86	3,000	70	2,600	67	3,800	87
		3,200	78	3,400	84	4,500	100
				3,500	82	2,900	66
				3,100	74	3,800	94
				3,900	89	3,700	91
				3,100	79	3,000	74
				3,300	78	4,400	105
				3,400	84	4,300	95
				2,500	59	4,300	100
				2,500	60	800	20
						3,200	79
<i>First Stage Silicosis</i>							
4,500	101	2,800	64				
4,100	98	3,500	83				
3,050	71	2,900	69				
3,800	88	3,400	80				
4,400	102	3,500	86				
4,450	102	3,900	92				
4,300	97	5,200	119				

42 per cent, with evidence of tuberculosis and silicosis complained of no respiratory symptoms whatever.

Appearance—With very few exceptions the men were of robust appearance and very well nourished. Overweight was the rule except in the group showing evidence of tuberculosis. In this the average weight for the group approximated the standard for its age and height. Build tended distinctly toward the short and stocky as can be seen from the average heights and weights given in Table VI. The same table shows the average actual vital capacity for each group and the average per cent of normal calculated on the basis of height.

Vital Capacity—In general, the per cent of normal vital capacity diminished with the increase in fibrosis, but in each group there were marked individual variations, dependent to some extent doubtless on degree of coöperation or on practice. Table VII gives the vital capacities and percentages of normal for 123 individuals arranged by X-ray groups.

In the negative group there were none whose vital capacity was less than 75 per cent of the calculated normal. In the group showing increased fibrosis 14 per cent had vital capacities 75 per cent or less of normal; in the "questionable silicosis" group there were 38 per cent with this degree of limitation; in the "first stage silicosis" group 20 per cent; in the "second stage silicosis" group 32 per cent. No relationship was found between subjective dyspnea and diminished vital capacity.

Chest Expansion—Chest expansion in all groups, including the negative, was less than normal. It averaged 6 cm. for this group, 5 cm. for those with first stage silicosis, and 4 cm. for those with second stage silicosis and silicosis with tuberculosis. The limitation of expansion was doubtless related to the

predominating broad-chested type as well as to fibrosis.

Clubbing—Clubbing of the fingers or definitely curved nails were found in one-half of the cases with evidence of tuberculosis and silicosis in contrast to 9 per cent in the negative group and 18 per cent in the group with second stage changes.

Lung Findings—Lung findings were variable and not of material aid in making a diagnosis of silicosis. Negative lungs were reported in approximately one-third of the cases showing second stage silicosis by X-ray. The presence of emphysema in many cases masked evidence of other changes. In 7 of the 31 with suggestive evidence of tuberculosis by X-ray, persistent râles were noted. Altogether clinical corroboration of the presence of tuberculosis by symptoms and physical signs was found in 12 of the 31 suspected cases.

Blood Counts—Complete blood counts were made in 20 cases including both silicotic and non-silicotic individuals, but did not show any significant variations from normal, and the average red blood cell count, white blood cell count, percentage hemoglobin, polymorphonuclears and lymphocytes were almost identical in all groups.

Sputum—Of the 34 specimens of sputum examined 2 were positive. Fifteen of the 34 came from the group suspected of tuberculosis. It seems quite possible that a higher proportion of positives would follow repeated examinations of concentrated specimens.

SUMMARY

Studies made in two representative stone yards showed that dust counts exceeded limits of safety in all operations except machine polishing and sawing.

Examination of 125 granite cutters revealed evidence of silicosis in 78 cases, or 62 per cent, of the group examined. In 41 cases, or 33 per cent,

the condition was advanced. In 12 cases, or 10 per cent, there was definite evidence of tuberculosis also, and in 19 cases, or 62 per cent, of the group ex- others, 15 per cent, it was suspected.

The study shows that the dust hazard in granite cutting shops about New York City is not controlled, and that the men are subjected in the course of their daily work to conditions which are so damaging to health as to demand immediate correction.

POSSIBILITIES OF CONTROL

There is no doubt that the serious hazard existing in stone yards can be controlled if there is a will to control it. The methods of control are the well known ones of local exhaust ventilation, direct protection of the workers by masks, and good housekeeping. The will to employ these methods must be aroused by education, and reinforced when necessary by law.

Exhaust Ventilation—Equipment can be and has been designed to remove dust from the point of origin in stone yards which is efficient and durable. The U. S. Public Health Service published *A Study of the Efficiency of Dust Removal Systems in Granite-Cutting Plants in Public Health Reports*, October 18, 1929, in which it was found as a result of a careful study of exhaust ventilation in two yards that in most instances it was possible to keep the dust concentration in the air of the sheds below 10 million particles per cu. ft. Exhaust for both surfacing machines and hand pneumatic tools is described.

Hatch, Drinker, and Choate in *A Laboratory Study of the Design of Dust Control Systems for Use with Pneumatic Granite Cutting Tools* appearing in the *Journal of Industrial Hygiene*, March, 1930, described the construction of devices for dust control in the use of pneumatic hand tools and surfacing machines which will maintain a maxi-

mum dust concentration of 10 million particles per cu. ft. Since the publication of the above article, one of the authors has installed a system which has demonstrated over a period of time its ability to maintain low dust concentrations in a large stone yard which is entirely enclosed.

The cost of such equipment is not prohibitive and its principles do not differ from the well known ones of exhaust ventilation wherever applied. It is true that a certain amount of intelligent coöperation on the part of the worker is necessary for securing best results, but this is not by any means impossible of achievement where the employer himself is interested and alert.

Masks—Where exhaust ventilating equipment is not installed, an alternative is direct protection of workers by the use of masks. Positive pressure masks or helmets supplying the wearer with clean air from an outside source are to be preferred wherever they are practicable, that is to say, where the worker's radius of movement is not over 10 feet. Operators on sandblasting and large surfacing machines could very well be so protected. For other workers who may be moving from place to place simple filter masks are recommended.

The Bureau of Mines' study, *Dust Respirators, Their Construction and Filtering Efficiency** shows that an efficient filter for dust particles, even those as small as 0.27 microns in diameter, can be made from a sufficient number of plies of muslin, cotton flannel, cheese cloth, or absorbent cotton, and a number of satisfactory respirators using this principle are obtainable in the market. When masks are used, one man must be assigned to the duty of distributing, collecting, cleaning, replenishing and generally keeping them in good condition; otherwise carelessness in their use and a false sense of protection will result.

* *Technical Paper 394.*

Good Housekeeping—Next to exhaust ventilation and direct protection by masks, good housekeeping plays an essential part in control of the dust hazard. Under this heading is included proper maintenance of equipment and the avoidance of any unnecessary dust exposure which might result from ill considered arrangements. An example of the latter found in one of the yards investigated, for instance, was the reconditioning of sand by screening which took place adjacent to the sandblast cabinet in a position which exposed a number of nearby workers to the dust so created. Poor maintenance, lack of good housekeeping was responsible for the fact that sandblast cabinets leaked and dust exhausted from the surfacing machines blew back under certain conditions into the yard. Again, as in the case of care of masks, attention to such details must be the business of somebody who understands the hazard and *wants* to control it.

Legislation—To create the will to control the hazard, continuous persistent dissemination of information is necessary, plus the stimulus of vigorously administered law. In New York State there is a Code of the Labor Department¹ having, as do all such codes, the force of law which specifies "Every granite working tool or machine shall be connected to an exhaust system including a separator that will remove all dust created by such machines or tools, in so far as it is practicable, at its point of origin."

The value of such a code strictly enforced is apparent. The trouble has

been in New York State in the past that the seriousness of the hazard has not been thoroughly appreciated and observance of the Code has not been insisted upon.

Finally, the most important factor of all in stimulating the institution of preventive measures in this or any industry with a similar hazard would be the inclusion of silicosis in the Workmen's Compensation Law. To achieve this end, those who are interested in silicosis prevention should bend every effort.

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Diphtheria Studies:

1. The Significance of the Schick Test in the Adult*

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OUR knowledge of the Schick test is limited almost entirely to data on the reaction in children. Little study has been made of the reaction in adults, especially older adults. Knowledge of the significance of the test in this group is of practical importance to the authorities responsible for immunization in institutions for adults. Furthermore, a detailed knowledge of the Schick reaction in relation to age would add to our understanding of the immunology of diphtheria.

There are indications that immunity to diphtheria in adults depends in part upon some factor not measured by the Schick test. Since the decrease of diphtheria with age is more rapid than would be expected from a knowledge of Schick reaction distribution in adults, it seemed possible that a comparison of blood antitoxin concentrations with Schick reactions might throw light on this discrepancy. We also desired information on the following points:

1. The level of antitoxin at which all adult Schick reactions are negative, and below which all are positive.

2. The immunologic significance of the pseudo and combined reactions, and of the type of tissue reaction (necrosis, vesiculation, pigmentation and erythema).

3. The relationship between the Schick reaction and antitoxin concentration in adults artificially immunized, as contrasted with adults naturally immunized.

4. The relationship of age to the correlation between antitoxin, Schick reaction, and tissue reaction, both before and after antigenic stimulation.

In children there is probably no antitoxin concentration (as determinable by available methods) below which all are positive to the Schick test, though as Dudley¹ points out in his critical review of the literature on the Schick test, most authors accept Schick's original figure of 0.033 unit as the "threshold." The results of Ramon and Debré² agreed with those of Schick. However, other critical levels are reported. In 1923, the Medical Research Council of Great Britain³ considered 0.025 to 0.017 unit as the dividing range. Schick⁴ in 1924 indicated that 0.005 unit was sufficient to render an individual Schick negative. Kellogg and Stevens⁵ found that 20 to 25 per cent of those receiving toxin-antitoxin became Schick negative with a final antitoxin level of less than 0.01 unit. Jensen⁶ believes that the Schick reaction does not divide children into high and low antitoxin groups which are mutually exclusive. He found that 9 per cent of the negatives, after antigenic stimulation of a group of positive children, had less than 0.01 unit, but

* Read before the Epidemiology Section of the American Public Health Association at the Sixty-second Annual Meeting in Indianapolis, Ind., October 9, 1933.

that 100 per cent of the positives had less than 0.003 unit. Flood believes that a positive Schick test always indicates susceptibility, but that a negative may or may not indicate immunity. Schick, Von Groer and Kassovitz⁸ found that 0.002 unit always gave a negative Schick and 0.005 always a positive. Kolmer and Moshage⁹ found it required at least 0.05 unit for a person to become Schick negative. Peckels¹⁰ found negative Schicks with less than 0.01 unit. Thiele¹¹ found that of 132 negatives 22 per cent had less than 0.05 unit of antitoxin. Curth and Lorenz¹² found that all Schick positive children had less than 0.04 unit, but that of 25 Schick negative children, 7 had less than 0.01 unit. Henseval and Clevers¹³ found that guinea pigs were negative to the Schick test when there was 0.005 unit, and positive when there was 0.0033 unit. Weichsel¹⁴ found that guinea pigs having 0.01 unit or more had negative Schick reactions. All with less than 0.01 unit were positive. He found that resistance to conjunctival infection with an old laboratory strain of *C. diphtheriae* correlated with the Schick reaction. However, resistance to conjunctival infection with a highly virulent strain occurred only when the pigs were negative to 1/25 of an m.l.d. instead of the 1/50 m.l.d. used in the Schick test, and when the antitoxin concentration was from 0.03 to 0.05 of a unit of antitoxin. Complete resistance to the infection was obtained only if the pigs were negative to 1/10 m.l.d.

Evidence has been submitted by several workers listed above to show that persons with negative Schick reactions, and as little as 0.01 unit of antitoxin, are not uncommon. In view of this the following gains in interest: That Park¹⁵ stated in 1926 that he had never seen an undoubted case of clinical diphtheria in a child who had recently had a negative Schick; that O'Brien, Okell,

and Parish¹⁶ observed only 18 frank but mild cases in 20,000 Schick negative persons; and that Lane and Forsbeck¹⁷ and Lane¹⁸ reported that of the 263 diphtheria deaths investigated in Massachusetts in 1926 and 1927, none occurred in Schick negative persons.

One is led to conclude that the negative test may sometimes indicate a non-antitoxic immunity, or an immunity which is not represented merely by the concentration of antitoxin in the blood stream. On the other hand, there is a widespread belief that with increasing age a positive Schick reaction has less and less significance as an indication of susceptibility.

Likewise the work of Von Groer and Kassowitz,¹⁹ Kuttner and Ratner,²⁰ Ruh and McClelland,²¹ and Cooke and Sharma²² demonstrating that the positive Schick reaction in a newly-born infant is often smaller and less intense than in the mother with the same concentration of antitoxin, seems to indicate that the Schick reaction may be influenced by factors other than the blood antitoxin concentration at the time of the test.

It seemed to us that a simultaneous determination of antitoxin concentrations and Schick reactions in the adult might throw further light on this problem.

METHODS

FIELD TECHNIC

All observations were on male adult patients in two Michigan hospitals for the insane.* Data from the two hospitals were routinely compared and found to be essentially similar. Blood was drawn not more than 24 hours before doing the Schick test. At first,

* We are indebted to Dr. Edmund A. Christian, Medical Superintendent of Pontiac State Hospital, and to Dr. R. Phillip Sheets, Medical Superintendent of Traverse City State Hospital, for their cooperation and assistance.

bloods were drawn with sterile dry syringes and transferred to vials which were then stoppered and refrigerated. Later, bloods were drawn directly into vials with suction apparatus.²³ This expedited the collection of blood and reduced contaminations. Schick reactions were read on the 4th and 6th day at one hospital, and on the 5th and 7th day at the other. Since analysis showed no significant differences, the 5th day reading in one hospital and the 6th day reading in the other were selected for this paper. Schick tests were done on the left forearm, controls on the right. Reactions were read by any one or more of the group after it was found that all members agreed as to interpretation of kind, size, intensity, and other characteristics.

Kind of Schick test as used in this article refers to the classification of reactions into negative, pseudo, combined, and positive. The reactions as to size were divided into 5 groups as follows:

Group	Diameter in Millimeters
1	0-9
2	10-19
3	20-34
4	35-44
5	45+

The complete Schick reading was represented by two numbers, the first giving the size of the control, the second the size of the test. Below are listed the symbols of the 15 possible readings excepting those occasional irregular readings in which the control reaction was larger than the test.

Negative	Pseudo	Positive	Combined
11	22	12	23
	33	13	24
	44	14	25
	55	15	34
			35
			45

Thus, a given symbol tells at once the kind of reaction as well as the approximate size of both the test and control reactions. After a few readings the

group was able to agree as to the correct symbol to assign. Naturally, if the size were 20 or very close to 20 mm. the symbol assigned by two observers might be "2" in one case, and "3" in the other. Furthermore, there were a few border-line reactions which required common sense interpretation, such as follows:

Control	Test	Interpretation
0 mm.	9 mm.	Positive rather than negative
19 mm.	21 mm.	Pseudo rather than combined
20 mm. faint reaction	20 mm. intense reaction	Combined rather than pseudo

The color of the Schick reaction was recorded as follows:

1. Flushing, a pink which disappears with pressure
2. Red, the red of the typical Schick reaction
3. Bright red, the "angry" red associated with inflammation
4. Purple, perhaps a reaction to trauma
5. Brown, the brown of pigmentation

In addition, vesiculation, induration, necrosis, swelling, and desquamation were recorded. Reactions occurring as two-shade zones were also recorded.

One, two, or three subcutaneous injections of toxoid were made at the time of Schick readings and thereafter at 3 week intervals. The post-antigenic stimulation Schicks were done 3½ months after the first toxoid inoculation at one hospital and 7½ months after the first toxoid inoculation at the other. Contaminated specimens were discarded. Sera were not separated from their blood clots at uniform intervals after procurement. Antitoxin titrations were made* according to Fraser's²⁴ modification of Römer's technic. Guinea pigs were used for test animals. Twenty inoculations were made on each pig.

* We wish to acknowledge the assistance of J. W. Glasen, H. C. Hollon, H. Kibbe and A. H. Tallman.

TABLE I
RELATIONSHIP OF ANTITOXIN CONCENTRATION TO SCHICK REACTION
PREVIOUS TO ANTIGENIC STIMULATION

Units of Antitoxin per c.c. of Serum	Number of Persons					Percentage Distribu- tion of Antitoxin Concentration in Each Schick Group				Percentage Distribution of Schick Reactions in Each Antitoxin Group				
	Pos.	Com.	Ps.	Neg.	Total	Pos.	Com.	Ps.	Neg.	Pos.	Com.	Ps.	Neg.	Total
0.001*	127	7	5	9	148	82.4	63.6	6.9	2.9	85.8	4.7	3.4	6.1	100.0
0.002	10	0	1	7	18	6.5	0.0	1.4	2.2	55.6	0.0	5.6	38.8	100.0
0.006	2	0	2	13	17	1.3	0.0	2.8	4.1	11.8	0.0	11.8	76.4	100.0
0.010	2	0	1	14	17	1.3	0.0	1.4	4.5	11.8	0.0	5.9	82.3	100.0
0.030	0	0	2	29	31	0.0	0.0	2.8	9.2	0.0	0.0	6.5	93.5	100.0
0.050	4	0	5	26	35	2.6	0.0	6.9	8.3	11.4	0.0	14.3	74.3	100.0
0.075	0	1	0	17	18	0.0	9.1	0.0	5.4	0.0	5.6	0.0	94.4	100.0
0.100	1	0	6	24	31	0.7	0.0	8.3	7.6	3.2	0.0	19.3	77.5	100.0
0.100	8	3	50	176	237	5.2	27.3	69.5	55.8	3.4	1.3	21.1	74.2	100.0
Totals	154	11	72	315	552	100.0	100.0	100.0	100.0	27.9	2.0	13.0	57.1	100.0

* The antitoxin concentrations of less than 0.002 units per c.c. of serum have for the purposes of analysis been assumed to average 0.001. Actually the relatively large number of antitoxin titrations below 0.002 point to a much lower average.

The pre-antigenic stimulation sera were titrated to 0.1 unit per c.c. Since 43 per cent of sera contained more than this amount of antitoxin the post-antigenic stimulation sera were titrated to 7.5 units. Levels for titration were chosen to include the various "Schick levels of antitoxin" reported by other workers. But examination of our results shows that for determining the distribution of antitoxin concentrations it would have been better to have covered a greater range. Limitations of the methods for antitoxin titrations however make determinations below 0.002 of doubtful value.

MATERIALS

Schick material: 1/50 m.l.d. per 0.1 c.c.
Toxoid T.C.S. Hosp. Lot # 17,
8 L's per c.c.
P.S. Hosp. Lot. # 20,
5 L's per c.c.

RESULTS AND DISCUSSION — SCHICK TEST AND ANTITOXIN CONCENTRATION

In Table I are listed the number of persons at each antitoxin level and in

each Schick group previous to antigenic stimulation.* The percentage distribution of Schick reactions by antitoxin levels is presented, as well as the percentage distribution of antitoxin levels by kind of Schick reaction. As expected, the positive reactions are mostly at lower antitoxin levels, and most of the negative reactions at upper levels. With enough figures to be significant we find that with each increase in the antitoxin concentration the percentage of negatives increases. Thus at 0.001,† 6.1 per cent of the Schick reactions are negative, at 0.002, 38.8 per cent are negative, and at 0.006, 76.4 per cent are negative. From this point on there is no significant change. If however the percentage of pseudos is added to the negatives, we find a continued trend toward 100 per cent immunity as measured by the Schick test. The percentage of pseudos also increases with

* Throughout this paper antigenic stimulation refers to artificial stimulation with toxoid or with Schick test material.

† Figures representing antitoxin concentrations always refer to units per c.c. of serum.

TABLE II
RELATIONSHIP OF ANTITOXIN CONCENTRATION TO SCHICK REACTION
AFTER ANTIGENIC STIMULATION OF SCHICK POSITIVE PERSONS

Units of Antitoxin per c.c. of Serum	Number of Persons					Percentage Distribution of Antitoxin Concentrations in Each Schick Group				Percentage Distribution of Schick Reactions in Each Antitoxin Group				
	Pos.	Com.	Ps.	Neg.	Total	Pos.	Com.	Ps.	Neg.	Pos.	Com.	Ps.	Neg.	Total
0.001	42	2	1	7	52	79.2	66.7	20.0	9.6	80.9	3.8	1.9	13.4	100.0
0.002	7	0	0	4	11	13.2	0.0	0.0	5.5	63.6	0.0	0.0	36.4	100.0
0.006	2	0	0	3	5	3.8	0.0	0.0	4.1	40.0	0.0	0.0	60.0	100.0
0.010	1	0	0	6	7	1.9	0.0	0.0	8.2	14.3	0.0	0.0	85.7	100.0
0.030	0	0	0	6	6	0.0	0.0	0.0	8.2	0.0	0.0	0.0	100.0	100.0
0.050	0	0	0	12	12	0.0	0.0	0.0	16.3	0.0	0.0	0.0	100.0	100.0
0.075	0	0	0	0	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
0.100	0	0	0	3	3	0.0	0.0	0.0	4.1	0.0	0.0	0.0	100.0	100.0
0.250	1	1	1	17	20	1.9	33.3	20.0	23.5	5.0	5.0	5.0	85.0	100.0
1.250	0	0	1	9	10	0.0	0.0	20.0	12.2	0.0	0.0	10.0	90.0	100.0
2.500	0	0	0	2	2	0.0	0.0	0.0	2.8	0.0	0.0	0.0	100.0	100.0
7.500	0	0	1	1	2	0.0	0.0	20.0	1.4	0.0	0.0	50.0	50.0	100.0
>7.500	0	0	1	3	4	0.0	0.0	20.0	4.1	0.0	0.0	25.0	75.0	100.0
Totals	53	3	5	73	134	100.0	100.0	100.0	100.0	39.5	2.2	3.7	54.6	100.0

each increase in antitoxin concentration, but our figures are too few to determine whether the percentage of pseudos tends to increase at a faster or slower rate than the percentage of negatives.

In Table II is shown the relationship between the Schick reaction and antitoxin concentration after antigenic stimulation of Schick positive persons. It may be noted that whereas there is

considerable scatter of the positives over the antitoxin range before antigenic stimulation, the positives are more concentrated at the low antitoxin levels after stimulation. With one exception, no positive had more than 0.01 unit after antigenic stimulation.

These data are summarized in Table III in such a way as to show the discrepancies. Perhaps the figures point

TABLE III
THE DISCREPANCY BETWEEN THE SCHICK REACTION AND ANTITOXIN CONCENTRATION
IF 0.03 UNIT PER C.C. BE CHOSEN AS THE DIVIDING LEVEL

	Schick Positives with 0.03 or More Units of Antitoxin Per c.c.			Schick Negatives with Less Than 0.03 Units of Antitoxin per c.c.		
	No.	% of Total Schick Tested	% of Positives	No.	% of Total Schick Tested	% of Negatives
Before Antigenic Stimulation	12	2.2	7.5	52	9.4	13.4
After Antigenic Stimulation	2	1.5	2.8	21	15.8	24.8

to a difference in the significance of the Schick reaction in naturally and artificially stimulated persons. The percentage of Schick positive persons having at least 0.03 unit of antitoxin is about half as great in those persons who have been artificially stimulated, as in those who have been naturally stimulated. On the other hand, the percentage of Schick negatives with less than 0.03 unit was approximately twice as great in a group after antigenic stimulation as in a group before antigenic stimulation. The difference in the distribution of the positives might be explained as due either to an allergic factor or to a dissimilarity in tissue permeability. The difference in the distribution of negatives might be explained as due to a lack of tissue susceptibility to diphtheria toxin, or as due to a local immunity resulting from increased permeability to antitoxin. These points are discussed later.

In Table IV are listed the results of

antigenic stimulation of those persons who were previously Schick positive although having 0.03 unit or more of antitoxin. The 3 persons remaining Schick positive were 3 of the 4 persons who showed a decrease in antitoxin concentration following antigenic stimulation. This perhaps indicates an error in the antitoxin titration either before or after stimulation. It would be a rather odd coincidence, however, that of the 4 such instances, 3 should have occurred in the persons who failed to become Schick negative. In each instance the positives were intense reactions ("14"). As has been stated, a number of sera were retitrated with a moderate difference in reading in only 1 of 16.

Most workers fail to find an antitoxin level below which all are positive. Experience with children has shown that most negatives have more than 0.03 unit, most positives less than 0.03 unit. Just what level will give the closest

TABLE IV
RESULT OF ANTIGENIC STIMULATION IN PERSONS WHO WERE PREVIOUSLY
SCHICK POSITIVE OR COMBINED ALTHOUGH HAVING
0.03 UNITS OR MORE PER C.C. OF SERUM

Antitoxin Concentration		Schick Reaction		No. of Toxoid Inoculations
Before Stimulation	After Stimulation	Before Stimulation	After Stimulation	
0.050	1.250	Pos. (13)	Neg.	1
0.050	2.500	Pos. (13)	Neg.	3
0.050	5.000	Pos. (13)	No Reading	1
0.100	0.001	Pos. (13)	Pos. (14)	2
0.100	0.001	Pos. (14)	Pos. (14)	3
0.100	0.006	Pos. (13)	Pos. (14)	1
0.100	0.030	Com. (23)	Pseudo (33)	2
0.100	1.875	Pos. (12)	(12) (11)	1
0.100	2.500	Com. (23)	Neg.	3
0.100	5.000	Pos. (12)	Neg.	1
0.100	5.000	Com. (23)	Neg.	1
0.100	7.500	Pos. (12)	Neg.	3
0.100	7.500	Pos. (13)	Pseudo (22)	2
0.100	>7.500	Pos. (12)	Neg.	3
0.100	>7.500	Pos. (12)	Neg.	1
0.100	>7.500	Com. (23)	Neg.	3
0.100	>7.500	Pos. (13)	Neg.	1

approach to mutually exclusive groups has not yet been agreed upon. In our series the positive reactions both before and after antigenic stimulation are a better index of the underlying antitoxin concentrations than are the negatives. Persons remaining Schick positive after antigenic stimulation are more likely to have an antitoxin concentration below 0.03 unit than are Schick positive persons previous to antigenic stimulation. On the other hand, in those Schick positive persons who had been antigenically stimulated, a resulting Schick negative would appear to be a less reliable indication that the antitoxin concentration is more than 0.03 unit than it is in persons naturally Schick negative. It would seem from these figures that with antigenic stimulation we created a group of Schick negatives having a lower mean antitoxin level than has a naturally Schick negative group. This difference may be due to a tendency for antitoxin increase to lag behind the change from the Schick positive to Schick negative, or perhaps it may represent a fundamental difference in the response to artificial as contrasted with natural antigenic stimulation. The figures also indicate that a person who is Schick

positive in spite of a high antitoxin level may become Schick negative after artificial stimulation. Examination of the individual cases bears this out.

ANTITOXIN AND SEVERITY OF SCHICK REACTION

In Tables V and VI it may be noted that with increased intensity of the positive and combined reactions there is an increased probability that the person has less than 0.03 unit. In other words, if our figures are significant, the lower the antitoxin concentration the more severe the reaction.

The "23" combined reaction, as one might suspect, is the least reliable index of antitoxin concentration. Exactly 50 per cent of the 14 "23" reactions in Tables V and VI were associated with less than 0.03 unit. The "23" reading of the six possible combined readings is the one which might actually be a pseudo reaction. Likewise the "12" of the four possible positive readings is the one which might actually be a negative. It is of interest then, that these two Schick classifications show the greatest discrepancy with antitoxin concentration. This is true in spite of the fact that when by actual measurement a reaction was a "23" but the

TABLE V
DISCREPANCY BETWEEN SCHICK SIZE AND ANTITOXIN CONCENTRATION
BEFORE ANTIGENIC STIMULATION

	Kind and Size of Schick Test											Totals
	Neg.	Pseudo			Combined			Positive				
	11	22	33	Total	23	24	Total	12	13	14	Total	
Total Number	319	68	4	72	10	2	12	25	104	27	156	559
No. with Less Than 0.03 Units	43	8	1	9	5	2	7	19	96	26	141	200
% with Less Than 0.03 Units	13	12	25	13	50	100	58	76	92	96	90	...

TABLE VI
DISCREPANCY BETWEEN SCHICK SIZE AND ANTITOXIN CONCENTRATION
AFTER ANTIGENIC STIMULATION OF SCHICK POSITIVE PERSONS

	Kind and Size of Schick Test								Totals
	Neg.	Pseudo	Combined	Positive					
	11	22	23	12	13	14	15	Total	
Total Number	78	5	4	11	32	10	5	58	145
No. with Less than 0.03 Units	21	0	2	10	31	10	5	56	79
% with Less than 0.03 Units	27	0	50	91	97	100	100	97	...

difference in diameter was considered to be trifling, the reaction was called a "22" or a "33." The figures are too few of course to be conclusive, but we believe size could be used in gauging the underlying antitoxin.

RESPONSE TO ANTIGENIC STIMULATION

Tables VII and VIII and those following are devoted to the relationship and interrelationship of the Schick test, the antitoxin concentrations, and antigenic stimulation to age. Table VII is concerned with the increase in antitoxin level caused by the stimulus of a single Schick test dose in Schick negative persons. It may be noted that in general, the higher the antitoxin level before antigenic stimulation, the higher

the level reached after antigenic stimulation; that the absolute increase is greatest in those in whom the original antitoxin level is highest; and that as the original antitoxin concentration approaches the natural limit the ratio of the final to the original antitoxin concentration decreases.

As has been mentioned elsewhere, there is an error in the first and last groups which makes the series of ratios even more striking than indicated in the table. The choice of the figure 0.001 is deliberately a conservative one, since the concentration of cases below 0.002 points toward a mean figure far below 0.001. Perhaps many of this group have no antitoxin. Thus the ratio of 1:1,630 is probably too small. On the

TABLE VII
CORRELATION BETWEEN ANTITOXIN CONCENTRATION BEFORE AND AFTER ANTIGENIC
STIMULATION IN SCHICK NEGATIVE PERSONS

Antigen		Original Antitoxin Concentration								
		0.001	0.002	0.006	0.010	0.030	0.050	0.075	0.100	>0.100
Schick Test Dose	Mean final antitoxin	1.631	0.445	0.330	0.579	0.929	1.167	1.056	1.111	1.287
	Mean increase	1.630	0.443	0.324	0.569	0.899	1.117	0.981	1.011	1.112
	Final A : original A	1630	222	54	57	31	22	13	10	7
	Number of cases	16	5	10	15	27	21	9	19	79
	Mean age	45	41	51	57	49	49	46	53	50

other hand, the pre-stimulation antitoxins were titrated only to 0.1 and consequently the ratio of 1:7 is probably too high.

The original antitoxin group which stands out as distinctly different from the rest in the series is the first one. While the ratio of final antitoxin to original antitoxin is very high as compared to the next highest ratio, it does fall naturally into the series of nine ratios. It is in the large absolute increase of antitoxin that the 0.001 group stands out as an exception. Whereas in the other members of the series the absolute increase of antitoxin is directly related to the original antitoxin level, the 0.001 group, instead of showing the smallest absolute increase, shows by far the greatest. Here then is a group of Schick negative persons who have trifling amounts of antitoxin or perhaps in most cases none, but are capable of responding to slight stimuli with a great increase in the antitoxin concentration. We have no evidence as to the meaning of this phenomenon. If observations by

others should confirm our findings, the way is opened to several problems of at least theoretic interest.

It would seem from Table VII and others that with increasing age the Schick reaction tends to become negative more rapidly than does the antitoxin concentration tend to reach the 0.03 level usually considered to indicate immunity.

Turning to Table VIII it may be seen that with Schick positive persons stimulated with a Schick test dose plus one, two or three doses of toxoid, the results are somewhat different, and also less significant, due to a scarcity of data. The antitoxic response, both absolute and relative, is slight as compared with the Schick negatives, in spite of the greater antigenic stimulation. Indeed, in our small series there was a group of 10 (boxed in Table VIII) in which the response was a negative one. The series is a small one, but only 1 of the 10 cases showed an increase in antitoxin concentration, and the cases were restricted to those receiving one or two

TABLE VIII

CORRELATION BETWEEN ANTITOXIN CONCENTRATION BEFORE AND AFTER ANTIGENIC STIMULATION OF SCHICK POSITIVE PERSONS

Antigen		Original Antitoxin Concentration							
		0.001	0.002	0.006	0.010	0.030	0.050	0.075	0.100
Schick Test Dose Plus One Tox. Inoculation	Mean final antitoxin	0.158	0.0002	0.005	0.001	...	3.125	...	...
	Mean increase	0.157	-0.0018	-0.001	-0.009	...	3.075	...	...
	Final A / original A	158	0.9	0.83	0.1	...	62	...	...
	Number of cases	35	4	2	1	...	2	...	...
	Mean age	44	40	47	50	...	52	...	...
Schick Test Dose Plus Two Tox. Inoculations	Mean final antitoxin	0.231	0.001	...	0.006	...	...	...	0.001
	Mean increase	0.230	-0.001	...	-0.004	...	...	...	-0.099
	Final A / original A	231	0.5	...	0.7	...	...	...	0.01
	Number of cases	20	1	...	1	...	...	...	1
	Mean age	43	55	...	50	...	...	...	35
Schick Test Dose Plus Three Tox. Inoculations	Mean final antitoxin	0.151	0.563	...	...	...	2.500	...	...
	Mean increase	0.150	0.561	...	...	...	2.450	...	...
	Final A / original A	151	281	...	...	...	49	...	...
	Number of cases	41	4	...	...	...	1	...	...
	Mean age	44	62	...	...	...	60	...	...

TABLE IX

ESTIMATED DIPHTHERIA CASE RATES PER 100,000 PERSONS WITH POSITIVE SCHICK TESTS*

Age Group	Case Rate per 100,000 Persons in Each Age Group	Case Rate per 100,000 Persons with Positive Schick Tests in Each Age Group	Per Cent Each Positive Schick Test Case Rate is of the 5-9 Rate
5-9	312	709	100
10-14	138	539	76
20-29	70	557	79
30-39	43	407	52
40-49	23	292	41
50-59	12	189	27
60	4	86	12

* These figures are based on over 20,000 cases in Michigan during 1924-1930, and on the percentage of Schick positive persons by age groups as compiled by Hope and Stallybrass in their *A Textbook of Public Health* from Park and Zingher's results. The 15-19 group is omitted because no results for ages 18 and 19 are given in Hope and Stallybrass's tabulation.

toxoid inoculations. The 1 case which increased became Schick negative after one inoculation. Of the remaining 6 receiving one inoculation, 5 remained positive and 1 became negative. With two inoculations all 3 remained positive. In the 0.001 group, in which there is a fairly large series, the advantage of repeated antigenic stimulation is not apparent as far as an increase of antitoxin is concerned. These same persons, however, showed a marked difference in the degree of shift from Schick positive to Schick negative, depending upon the number of toxoid inoculations, as may be noted below:

Antigenic Stimulation	Per cent of Schick Positive Originally Having 0.001 Unit Which Became Schick Negative After Antigenic Stimulation
Schick test dose plus one toxoid inoculation	25
Schick test dose plus two toxoid inoculations	58
Schick test dose plus three toxoid inoculations	80

The group with a very low antitoxin concentration before antigenic stimulation, whether positive or negative, was slightly younger than the other groups.

The figures of Park and Zingher show that the shift in Schick reaction from positive to negative in childhood and youth is continued through adult life. In Tables VII and VIII it would appear that the antitoxin concentrations also increase with age.

RELATIONSHIP OF AGE TO THE SIGNIFICANCE OF THE POSITIVE SCHICK TEST

In Table IX are shown estimated case rates per 100,000 positive Schick tests based on Michigan morbidity reports and upon Park and Zingher's data on the age distribution of Schick tests as compiled by Hope and Stallybrass.²⁵

We wish to point out that with increasing age the rate rapidly decreases. The application of New York data on the age distribution of positive Schick tests to Michigan case rates in order to obtain case rates among Schick posi-

TABLE X

RELATIONSHIP OF ANTITOXIN CONCENTRATION TO SCHICK REACTION PREVIOUS TO ANTIGENIC STIMULATION, BY AGE GROUPS

	Age Group	Pos.	Com.	Ps.	Neg.	Pos. & Com.	Ps. & Neg.	Total	Per cent Negative
Less Than 0.03 Units of Antitoxin Per c.c. of Serum	15 - 39	40	1	4	11	41	15	56	26.8
	40 - 64	91	6	4	18	97	22	119	18.5
	65 - 89	9	0	1	14	9	15	24	62.5
	Total	140	7	9	43	147	52	199	26.1
0.03 Units of Antitoxin or More Per c.c. of Serum	15 - 39	5	3	16	55	8	71	79	89.9
	40 - 64	7	1	42	169	8	211	219	96.8
	65 - 89	3	0	5	51	3	56	59	95.0
	Total	15	4	63	275	19	338	357	94.6

tives by age groups does not seem to us objectionable since one would expect the rate of decline to be even greater, had we been able to use data from the more rural population of Michigan. Unless decreased exposure with age is the explanation for this phenomenon, a theory which seems improbable to us, this table suggests factors in the mechanism of diphtheria immunity which are as yet unexplained.

Further evidence that there are such factors, is suggested by the data in Table X. Here it appears that in spite of the general upward trend of antitoxin concentration with age, the percentage of persons with a negative Schick test and a low antitoxin concen-

tration is higher in the age group above 65 than in the group below. Conversely, the Schick positive state is more likely to be associated with a high antitoxin concentration in those under 40 than in those over 40. With increasing age perhaps one or more of the following phenomena take place in a few individuals:

1. Rate of antitoxin production increases.
2. Antitoxin already produced is more quickly mobilized and concentrated at a needed place.
3. Increasing specific or nonspecific permeability of tissue to antitoxin, or to the antitoxin vehicle if there be one, assures immunity at a lower blood antitoxin concentration.
4. Some other factor together with anti-

TABLE XI

RELATIONSHIP OF ANTITOXIN CONCENTRATION TO SCHICK REACTION AFTER ANTIGENIC STIMULATION, BY AGE GROUPS

Antitoxin Concentration	Age Group	Pos.	Com.	Ps.	Neg.	Pos. & Com.	Ps. & Neg.	Total	Per cent Negative
Less Than 0.03 Units of Antitoxin Per c.c. of Serum	15 - 39	10	0	1	6	10	7	17	41.2
	40 - 64	36	2	0	12	38	12	50	24.0
	65 - 89	5	0	0	3	5	3	8	37.5
	Total	51	2	1	21	53	22	75	29.3
0.03 Units or More of Antitoxin Per c.c. of Serum	15 - 39	0	1	1	20	1	21	22	95.4
	40 - 64	1	0	1	30	1	31	32	96.8
	65 - 89	0	0	0	4	0	4	4	100.0
	Total	1	1	2	54	2	56	58	96.6

TABLE XII
CHANGE IN ANTITOXIN CONCENTRATION FOLLOWING ANTIGENIC STIMULATION
OF SCHICK POSITIVE PERSONS

Shift in Antitoxin Concen- tration	Antigenic Stimulation														
	Schick Test			Schick Test Plus 1 Toxoid Inoculation			Schick Test Plus 2 Toxoid Inoculations			Schick Test Plus 3 Toxoid Inoculations			Total		
	No.	Mean Age	% Dist.	No.	Mean Age	% Dist.	No.	Mean Age	% Dist.	No.	Mean Age	% Dist.	No.	Mean Age	% Dist.
Increase	114	50	83.8	15	48	32.6	14	43	58.3	39	44	79.6	182	48	71.4
No Change	11	48	8.1	24	43	52.2	6	42	25.0	9	49	18.4	50	45	19.6
Decrease	11	51	8.1	7	47	15.2	4	44	16.7	1	70	2.0	23	49	9.0
Total	136	50	100.0	46	45	100.0	24	43	100.0	49	45	100.0	255	48	100.0

toxin makes antitoxin of relatively less importance in the protection of tissue, *e.g.*, decreased susceptibility to diphtheria toxin.

The coexistence of considerable antitoxin and a positive Schick test in early adult life might be explained as a corollary of the above; namely, that in some young adults due to an absolute or relative lack of the factors above, immunity is maintained only if the antitoxin concentration is at a high level. The trend of antitoxin concentration from youth to age, as may be noted in the last column of Table XIII does not, however, bear out such a theory unless possibly the effect of a large group of persons with decreasing antitoxin is cancelled by that of a large group with increasing antitoxin.

A simple explanation of the phenomenon would be that it is due to existence of an allergic response to the diphtheria toxin molecule; in other words, that what we have called a positive Schick in the high antitoxin persons was really a sensitivity reaction to the toxic principle of diphtheria toxin.

Table XI shows data after antigenic stimulation similar to that shown in Table X before stimulation. The data

are too few and irregular to justify any conclusions.

Table XII shows that in Schick positive adults, the greater the antigenic stimulus, the greater the immunologic response.

In Tables XIII and XIV are data showing the relationship of age to antitoxin concentration before and after antigenic stimulation. Table XIII shows more clearly what has been pointed out before, that with increasing age the percentage of persons with less than 0.03 unit decreases. In the first three decades tabulated, 41.7 per cent had less than 0.03 unit, while in the age period 50-79 only 30 per cent had less than 0.03 unit. How antitoxin response in Schick positive persons stimulated antigenically is related to age would be useful information, but as may be seen in Table XIV, our data are too few and irregular for any conclusion to be drawn.

Examination of Table XV shows a fairly definite increase in the percentage of Schick negatives with age, indeed a quite decidedly greater shift with age than was evidenced in the shift from below to above 0.03 unit of antitoxin.

TABLE XIII
RELATIONSHIP OF AGE TO ANTITOXIN CONCENTRATION PREVIOUS TO
ANTIGENIC STIMULATION

Age Group	Serum Antitoxin Levels				Total		Total Under 0.03 Units	
	0.001	0.002 To <0.03	0.03 To <0.175	0.175 or More	No.	%	No.	%
20-29	10	3	4	18	35	6.3	13	37.1
30-39	36	7	16	38	97	17.5	43	44.3
40-49	56	9	27	66	158	28.6	65	41.1
50-59	25	16	38	58	137	24.8	41	29.9
60-69	17	8	21	36	82	14.8	25	30.5
70-79	4	9	9	22	44	8.0	13	29.5
Total	148	52	115	238	553	100.0	200	36.1
% of Total	26.7	9.5	20.8	43.0	100.0	....	....	....
Mean Age	46	54	52	50	50	....	48	....

It will be noticed that the sensitivity reactions, the pseudos and combineds, occur in a younger age group than the negatives and positives. Interestingly enough, when the positives were given antigenic stimulation and again Schick tested a similar age relationship held true: the pseudos had a lower mean age than the negatives and the combineds than the positives. Apparently sensitization took place more readily in the

younger age group. Of the twelve combineds in Table XV, all of whom had been antigenically stimulated, 10 had been changed to negatives and 2 had been changed to pseudos.

Table XVI is included to complete the record. The data are too few to justify any conclusions.

We realize that as a practical measure of immunity to diphtheria the Schick test has proved its worth, and

TABLE XIV
RELATIONSHIP OF AGE TO ANTITOXIN CONCENTRATION FOLLOWING
ANTIGENIC STIMULATION IN PERSONS PREVIOUSLY SCHICK POSITIVE

Age Group	Serum Antitoxin Levels				Total		Total Under 0.03 Units	
	0.001	0.002 To <0.03	0.03 To <0.175	0.175 or More	No.	%	No.	%
20-29	3	3	2	5	13	9.8	6	46.1
30-39	9	1	9	6	25	18.8	10	40.0
40-49	19	9	5	10	43	32.3	28	55.1
50-59	15	5	5	6	31	23.3	20	64.5
60-69	3	3	1	9	16	12.0	6	37.4
70-79	3	1	0	1	5	3.8	4	80.0
Total	52	22	22	37	133	100.0	74	55.6
% of Total	39.1	16.5	16.5	27.9	100.0	.....	.....	.....
Mean Age	48	48	43	48	47	.....	48	.....

TABLE XV
RELATIONSHIP OF AGE TO SCHICK REACTIONS PREVIOUS TO ANTIGENIC STIMULATION

Age Group	Kind and Size of Schick Reaction															
	Neg.				Pseudo				Combined				Positive			
	11	22	33	Total	23	24	Total	12	13	14	Total	No.	%	No.	%	Total
20 - 29	18	5	0	5	0	1	1	5	5	1	11	23	65.7	12	34.3	35
30 - 39	47	13	1	14	2	0	2	5	24	5	34	61	62.9	36	37.1	97
40 - 49	72	21	2	23	5	1	6	9	33	14	56	95	60.5	62	39.5	157
50 - 59	85	17	0	17	3	0	3	2	25	3	30	102	75.5	33	24.5	135
60 - 69	58	8	0	8	0	0	0	1	12	3	16	66	80.5	16	19.5	82
70 - 79	34	3	0	3	0	0	0	1	5	1	7	37	84.1	7	15.9	44
Total	314	67	3	70	10	2	12	23	104	27	154	384	69.8	166	30.2	550
Mean Age	52	48	42	48	46	35	44	41	48	47	47	51	...	47	...	50

therefore the level of circulating anti-toxin with which it is associated is not of great practical concern. But it is important immunologically. Our results, in accord with others, do not point to the existence of a level dividing all persons into the two exclusive groups of Schick positives and negatives, but our results do suggest a possible explanation for the several "Schick levels"

suggested in the literature. The anti-toxin concentration in the blood seems to lag behind the change from Schick positive to negative, and this lag seems to exist both in those developing a natural immunity and in those receiving artificial stimulation. One would conclude from this that Schick tests done at different intervals after either artificial or natural stimulation would

TABLE XVI
RELATIONSHIP OF AGE TO SCHICK REACTIONS FOLLOWING ANTIGENIC STIMULATION OF PERSONS PREVIOUSLY SCHICK POSITIVE

Age Group	Kind and Size of Schick Reaction										Total					
	Neg.		Pseudo		Com.		Positive				Neg. & Pseudo		Pos. & Com.		Total	
	11	22	23	12	13	14	15	Total	No.	%	No.	%	No.	%	No.	%
20 - 29	9	1	0	0	2	0	0	2	10	83.3	2	16.7	12	9.2		
30 - 39	15	1	1	1	4	2	1	6	16	64.0	9	36.0	25	19.0		
40 - 49	20	1	1	3	12	4	1	20	21	50.0	21	50.0	42	32.0		
50 - 59	13	0	2	3	10	2	1	16	13	41.9	18	58.1	31	23.7		
60 - 69	13	0	0	0	2	1	0	3	13	81.2	3	18.8	16	12.3		
70 - 79	1	0	0	1	1	2	0	4	1	20.0	4	80.0	5	3.8		
Total	71	3	4	8	31	11	3	53	74	56.5	57	43.5	131	100.0		
Mean Age	46	35	47	51	48	52	45	49	46	.....	49	.....	47	.....	

be associated with different "Schick levels" of antitoxin. We feel this to be a point worthy of study.

SUMMARY

A study of the relationship between the Schick reaction, antitoxin concentration, antigenic stimulation, and age in male adults, was made in two Michigan hospitals for the insane. The following observations were made from the data:

1. Our results indicate that there is no antitoxin level in adults below which all Schick reactions are positive, and above which all are negative.

2. 0.03 unit seems a satisfactory level to use as a dividing point. At any rate we are not able to suggest a better level.

3. "False negatives" and "false positives," basing these terms on the assumption that 0.03 unit or more means immunity and less than 0.03 unit susceptibility, occur in different proportions, before and after antigenic stimulation.

4. While the percentage of Schick negatives and the concentration of antitoxin increases with age, the percentage of Schick negatives increases more rapidly with age than does the percentage of antitoxin concentrations at or above 0.03 unit.

5. Our data suggest that the intensity of reaction of the Schick test is correlated to a certain degree with the antitoxin concentration. That the relationship is not more marked suggests that the mere concentration of antitoxin in the blood stream is but one factor in the relationship of antitoxin to the Schick reaction.

6. We were unable to discover the significance of such tissue reactions as intensity of erythema, necrosis, vesiculation, marked pigmentation, "two zone reactions," etc.

7. It is suggested that in order to explain why the case rate among Schick positive per-

sons decreases with age, an immunity depending upon some factor other than circulating antitoxin must be postulated.

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Official Reporting of Childhood Type of Tuberculosis

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THE subject of the childhood type of tuberculosis has been receiving greater attention during the last two years, and tuberculin testing and X-raying of school children have become a more common procedure. To find out to what extent this change in emphasis has been reflected in official registration of the childhood type of tuberculosis cases, the National Tuberculosis Association recently instituted an inquiry. A brief questionnaire, very brief in fact, consisting of but two questions, was sent to every state health officer. These inquiries were: (1) Is the childhood type of tuberculosis reportable under the laws of your state? (2) How many cases of childhood type of tuberculosis were reported in your state in 1932?

The inquiries were made in 1933 and covered the calendar year 1932. It is quite evident from the replies that as yet there is no general effort to report childhood type of tuberculosis by physicians, and there is little attempt on the part of health officials to see that it is reported.

State laws require that tuberculosis, all forms, shall be officially reported, most of them requiring in addition that the organ or part affected shall be specified. The question at issue is whether the childhood type of tuberculosis comes within the meaning of these statutes. Is the childhood type of tuberculosis officially tuberculosis? The official attitude seems to be that of *laissez faire*, leaving to the individual physician the

interpretation of the statute. If such cases are reported they are included in the official register. Some physicians to be on the safe side report such cases; most do not.

All but one state officer, Utah, replied to the questionnaire. Of the 48 states—including the District of Columbia—replying, 29 said that there was no differentiation as to childhood type of tuberculosis, that *all* cases of tuberculosis were reportable. Fourteen states replied that the childhood type of tuberculosis was not reportable, which may mean that they have made their own interpretation of the statutes in this respect. The remaining 5 states replied that it was reportable, 2—Georgia and Michigan—having made it so by regulation.

It seems highly probable, however, from the general tenor of the replies that the states which replied simply "No" to the question of reporting childhood type tuberculosis meant to infer not that it was not reportable, but that the statutes or regulations did not specifically state that it should be reported; in other words, that no differentiation was made in regard to it.

If we incline to this interpretation, which seems a plausible one, then 43 of the 48 replies showed that there was no specific law or regulation to enforce the reporting of that type of tuberculosis.

From many of the replies it seems probable that "childhood type of tuberculosis" was confused with "tuberculosis in childhood," since in

answer to the second inquiry as to the number so reported some of the replies gave the number of reported cases of tuberculosis "under 15 years of age." Of course, these are two almost entirely separate categories. Children (under 15) may have every kind of tuberculosis, pulmonary, joint, bone, gland, miliary, meningeal, and intestinal. About 35 per cent of tuberculosis deaths among children are from meningeal tuberculosis.

But the term "childhood type of tuberculosis" is distinct from all the others specified above, and is the name which has been given to the pathological effect which the initial infection with tubercle bacilli has on the lung tissue and the tracheobronchial glands. Paradoxical as it may seem, "childhood type of tuberculosis" may occasionally occur in adults, and is often seen in adult Negroes and Indians, racial groups which have not been through generations exposed to tuberculous infection.

Only 9 states replied giving the actual number of cases of "childhood type tuberculosis." These totaled a little over 2,300. There were a few more numbers reported but as they were designated as "under 15" they have not been included. The states reporting actual figures for childhood type tuberculosis are those in which we know intensive special studies for tuberculosis among children are being conducted.

So much for what is being done. What should be the policy for the future? From the public health standpoint, should the childhood type tuberculosis be made specifically reportable? I think the answer for the time being must be "No." At the present time there is no unanimity of thinking as to the prognosis of such cases.

The outcome is dependent on the resistance of the tissues and the particular environmental conditions of the individual child. To some children it is a benign condition which takes care of

itself, ultimately heals, and confers a certain modicum of immunity; to other children it is the beginning of a morbid condition which needs very special care. So far as our limited figures tell the story to date, the numbers are about evenly divided between these two categories.

If we could be prescient and foresee which cases might develop into active cases of pulmonary tuberculosis, those might be made reportable, but to brand all such cases with the stamp of tuberculosis would be an injustice the effects of which might last through a generation.

Then there is the old but still potent reason which physicians always fall back on for not reporting tuberculosis cases; *viz.*, that nothing is done about it if they do report them. That is still true in many places. Then why add another category of reportable disease when facilities are meager, nonexistent, or non-operable for cases of disease already reported?

The public health policy back of all official reporting of disease, whether tuberculosis or any other communicable one, is to protect the public from further infection due to it. This protection is brought about by isolation of the case itself or by rigid aseptic technic in the home, and by examining all contacts, and immunizing them by a specific agent if known, or by giving them protective care.

How well is this carried out in the case of active pulmonary tuberculosis? Most special studies, except where very intensive contact work has been done, show that about 1 in 4 contacts is given a thorough physical examination. How can we expect the contacts of childhood type tuberculosis to receive any more thorough protective care? Of course, in childhood type tuberculosis the search in the immediate family for the active case or the carrier which has spread the infection is an impor-

tant public health measure. But the few statistical studies which have been made show that only about one-half of the cases of childhood type tuberculosis have any *known* family case to which the infection can be traced.

There is a third reason for not reporting childhood type tuberculosis. More and more the American Public Health Association *Appraisal Form* is coming into general use. Some of the ratios in it used to measure accomplishment in tuberculosis work are based on *active* cases of tuberculosis reported. For instance, 2 *new* cases reported each year to each annual death is 100 per cent attainment in reporting. The in-

clusion of all unearthed childhood type of tuberculosis cases in certain few areas where intensive school health examinations were carried on and the absence of such reports where no special work was carried on would make a lop-sided picture. If *every* case of childhood type tuberculosis in the United States could miraculously be discovered in a single year, we might then well advocate universal reporting of such cases. But as that millenium, as the word indicates, is a thousand years in the future, it seems better for the present to create no special laws for the compulsory reporting of childhood type tuberculosis.

AN OUTFIT FOR THE RAPID COLLECTION OF BLOOD SAMPLES

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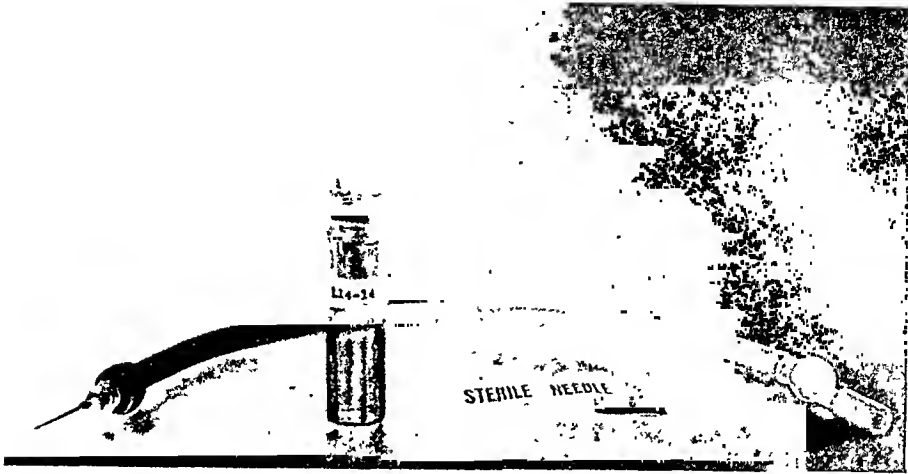
THE necessity for collecting many blood samples during a clinic has called to our attention the inefficiency of using syringes. The outfit described in this note has greatly facilitated the collection of blood samples. It is simply a modification of the larger suction apparatus frequently used for obtaining blood for convalescent serum.

The parts of the outfit illustrated below are:

1. Shell vials, 16.5 x 58 mm. (5 c.c. capacity) with # 0 red rubber stoppers cut to length of $\frac{1}{2}$ ". (Black rubber stoppers and cork stoppers plug the needles.)
2. Two-way needles, 21 gauge, $1\frac{1}{2}$ " x $\frac{5}{8}$ ".
3. Suction assemblage: Rubber tubing, $\frac{3}{16}$ x $\frac{1}{16}$ x 18" with cotton plugged mouthpiece, needle adapter, and 19 gauge, $\frac{3}{4}$ " needle.

Previous to the time of the clinic, the

rubber-stoppered vials and individually wrapped two-way needles have been sterilized. The vials are transported in aluminum boxes which measure 6"x12"x2" (162 vials). The needle point with the shorter shank is pushed through the rubber stopper so that the point projects just beyond the bottom of the stopper. The needle of the suction assemblage is then pushed through the stopper in like manner. With the mouthpiece in place, the free point of the two-way needle is inserted into a vein and suction is applied. After the vial has been filled, both needles are withdrawn and in a few moments a vial is ready for obtaining the next sample. Numbered adhesive labels have been found a great convenience. Such a label is readily transferable.



OUTFIT FOR COLLECTION OF BLOOD SAMPLES

The outfit has these advantages:

1. It is inexpensive, since all parts may be used repeatedly.
2. It is compact.
3. Sterilization at the clinic is unnecessary.
4. Blood may be drawn very quickly.
5. Clotted blood in syringes ceases to be a problem.
6. Blood is drawn directly into the final container.

7. The increased efficiency of the method results in a decreased confusion in the clinic and in a less concerned attitude on the part of the donor.

8. Serum may be readily separated from the clot by pouring.

9. The outfit may be conveniently used for whole blood samples and for blood culturing.

10. The particular size of vial found useful for our purpose fits the ordinary centrifuge shields and yields about 2.5 c.c. of serum.

State and Provincial Health Authorities Favor Pasteurized Milk

DR. CRUMBINE'S report indicated that 45 milk-borne epidemics had occurred during 1933 in 24 states, according to reports of state health officers, 44 of these epidemics having been traced to raw milk and one to raw cream.

Referring to undulant fever, Dr. Crumbine said:

The 4 epidemics of undulant fever reported for 1933, and none for 1932 would not seem to indicate a wide distribution of the disease or that it constituted an important health problem in relation to milk. But when we consider the 1,502 cases and 71 deaths re-

ported by the U. S. Public Health Service occurring during the fiscal year 1933, and the other large number of unreported and unrecognized cases that probably occurred, it must be admitted that undulant fever is a health and economic problem of major importance. Infected dairy herds are widely distributed over the United States and Canada, the rate of infection running from 5 to 50 per cent or higher.

If there were additional reasons needed for universal pasteurization of milk, the increasing menace of undulant fever would provide them.—

Health News, New York State Dept. of Health, 11, 26 (June 25), 1934.

A New Mechanism of Defence Against Bacteria Through the Use of Certain Foods*

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THE bacteriology of the intestinal tract has been investigated in this laboratory for the last few years and a new viewpoint has been developed (Arnold¹). Since this review article was published, several contributions have been made which extend our information relative to the adaptation of the bacterial flora within the lumen of the gastrointestinal tract, according to the physiological adaptation of the organism to its environment (Arnold and Kaufman,² Nedzel and Arnold,³ Johnson and Arnold,⁴ Nedzel, Stonecipher and Arnold,⁵ Seidmon and Arnold,⁶ Arnold, Korando and Ryan,⁷ and Arnold⁸).

In coöperation with Dr. Walter Eddy of the Teachers College of Columbia University, the use of certain foods has been investigated to determine if they will influence the defensive mechanism of the body against orally ingested bacteria. In order to maintain quantitative relationships we have restricted our experiments to the use of desiccated fruits and vegetables.

The technic outlined by Arnold, Korando and Ryan,⁷ who investigated the influence of cornstarch, sucrose, and banana powder on the acid-base

equilibrium and flora of the gastrointestinal tract of rats, has been carried out in these studies. This work showed that the use of these three carbohydrate foods did not alter the acid-base equilibrium or the intestinal flora of the gastrointestinal tract. There was, however, a change in the phage susceptibility of the *B. coli* flora. Table I gives the basal diets we have used in these experiments. We have

TABLE I

Basal Diet

Casein	18 per cent
Butter fat	3 per cent
Cod Liver Oil	2 per cent
Salt Mixture (Osborne & Mendel)	4 per cent
Carbohydrate	68 per cent

Fresh vegetables daily

1 gram dried yeast added daily
to feeding

Cornstarch — Control

Banana

* * * *

Apple

Tomato

Prune

carried out only one small experiment using five rats upon the prune diet. Only a few experiments have been carried out with the tomato diet and three experiments have been completed with the apple diet. The cornstarch and banana diets have been studied for 2 years. This paper will concern itself

* Read before the Food and Nutrition Section of the American Public Health Association at the Sixty-second Annual Meeting in Indianapolis, Ind., October 11, 1931.

TABLE II

AVERAGE RATIOS OF GRAM-POSITIVE: GRAM-NEGATIVE BACTERIA IN GASTROINTESTINAL SEGMENTS

Diet	<i>Feces at Beginning of Diet</i>	<i>Stomach</i>	<i>Duodenum</i>	<i>Jej.₁</i>	<i>Jej.₂</i>	<i>Jej.₃</i>	<i>Ileum</i>	<i>Caecum</i>	<i>Rectum</i>
Cornstarch	1:3	1:1	4:3	2:1	5:2	3:1	4:1	1:3	1:3
Apple	2:5	2:1	3:1	3:1	5:2	3:1	5:2	2:5	2:3
Banana	1:2	3:1	3:1	5:1	4:1	3:1	5:2	3:5	1:2

mainly with the comparison of cornstarch and banana diets. The information we have upon apple, tomato, and prune is only of a preliminary nature. Table II shows the Gram-positive and Gram-negative ratio of bacteria, determined by direct smears from various segments of the gastrointestinal tract of the rats fed cornstarch, apple, and banana for 3 weeks period of time. Table III shows the hydrogen-ion concentration of the various segments of the gastrointestinal tract, which was carried out on the same segments as reported in Table II. Both of these tables are averages of approximately 300 rats on cornstarch, 300 on banana, and 45 rats on apple diet. It will be seen that both the bacterial flora and the acid-base equilibrium within the lumen of the intestinal tract are approximately the same with the use of these three basal diets.

B. enteritides was fed by stomach tube to rats. The dose was 2.0 c.c. We have used various periods of feeding, but for this paper we will only report upon feeding experiments which were carried out as follows: Rats were placed on the basal diet for 1 week; *B. enteritides* was then administered by

stomach tube. The animals were weighed regularly and observed several times each day for diarrhea or other abnormal symptoms. A series of experiments was carried out in which two carbohydrates were used in the diet instead of the single addition as mentioned above. Thirty-four per cent banana powder and 34 per cent cornstarch were used; apple and cornstarch, and tomato and cornstarch were used in the same half and half proportions. Table IV gives the results of a series of such experiments in which diarrhea is recorded in the table. It will be noted that banana, apple, and prune diets protected the rats from diarrhea. Cornstarch and tomato diets did not seem to be protective. When banana was mixed with cornstarch in equal proportions this protective action seemed to have been lost. The tomato mixed with cornstarch did not differ from the tomato diet alone.

The average gain in weight of rats shown in Table IV has been recorded and is shown in Table V. It will be seen that the banana-fed rats have the greatest gain in weight. It does not seem that the growth factor is the one responsible for the resistance enjoyed

TABLE III

AVERAGE HYDROGEN-ION CONCENTRATION OF GASTROINTESTINAL SEGMENTS OF RATS ON VARIOUS DIETS

Diet	<i>Stomach</i>	<i>Duodenum</i>	<i>Jej.₁</i>	<i>Jej.₂</i>	<i>Jej.₃</i>	<i>Ileum</i>	<i>Caecum</i>	<i>Rectum</i>
Cornstarch	2.71	6.2	6.2	6.12	6.11	6.44	6.36	6.25
Apple	2.75	6.2	6.37	6.22	6.28	6.69	6.73	6.41
Banana	2.88	5.88	6.0	6.18	6.48	6.75	6.58	6.45

TABLE IV

DIARRHEA IN RATS ON VARIOUS DIETS AFTER *B. ENTERITIDES* FEEDING

Number Animals	Diet	Time of Occurrence of Diarrhea	Total Days
270	Cornstarch	4th to 10th day	6
270	Banana	No diarrhea	0
30	Apple	No diarrhea	0
30	Tomato	5th to 9th, 15th to 19th day	8
5	Prune	No diarrhea	0
15	Banana and Cornstarch	4th to 8th, 14th to 16th day	6
15	Apple and Cornstarch	4th day	1
15	Tomato and Cornstarch	4th to 8th, 14th to 16th day	6

by these animals against diarrhea after enteritides feeding.

Each cage contained 15 rats, in our experiments. Five rats were chosen and labeled, from each cage. Daily cultures of freshly obtained feces were carried out on these 5 rats from each cage. During the first 3 days after *B. enteritides* feeding, the feces were positive in most all instances. After this period of time, one or two colonies were sometimes observed, but there was no correlation between diarrhea and *B. enteritides* in the feces. The cornstarch series of rats showed positive *B. enteritides* longer than any other groups in this series.

Three weeks after the *B. enteritides* was administered, all the animals were sacrificed and organ cultures made from

spleen, kidney, liver, heart's blood and the gastrointestinal tract. Considerable variation was found in different cages, even on the same diet, in so far as organ cultures were concerned. Approximately one-third of the animals were found to have *B. enteritides* in the liver; one-fourth were found to have *B. enteritides* in the spleen. The kidney, heart's blood, and the ileum were negative for *B. enteritides*.

We have obtained 21 cultures of the *B. enteritides* group from various laboratories in this country and Europe. A strain sent us by Dr. Karl Meyer of the University of California has proved to be the most virulent strain we have tried in our experiments. This has been designated as the "KM" strain. This strain does not produce regular mortality in rats, even on the cornstarch diet. We have been unable to step up the virulency of this strain by animal passage. Morbidity, based upon the appearance of diarrhea, has been our test of virulency in this study.

B. enteritides isolated from various segments of the gastrointestinal tract and from the feces, as well as from the internal organs of rats fed the cornstarch and the banana diets, have been the same as the original strain, as judged from virulency, biochemical, colony formation, and antigenic tests.

A series of acute experiments were carried out in which rats were killed 1, 3, 6, 24 hours, and 1, 2, and 3 weeks

TABLE V

Diet	Average Weight at Beginning of Diet	Average Final Weight, 4 Weeks on Diet	Average Weight Gain per Rat
	Grams	Grams	Grams
Cornstarch	48	134	86
Banana	48	141	93
Apple	48	100	52
Tomato	60	115	55
Prune	78	114	36
Cornstarch and Banana	67	124	57
Cornstarch and Apple	65	117	52
Cornstarch and Tomato	73	118	45

after feeding *B. enteritides*. This was carried out with rats on cornstarch and banana diets. The distribution of *B. enteritides* within the lumen of the gastrointestinal tract, and in the liver and spleen, was approximately the same in both series.

Graduated doses of *B. enteritides* were injected intraperitoneally in rats to determine the smallest amount causing death in animals. The average dose was found to be 0.25 c.c. of a 24 hour old broth culture. Table VI shows the result of a series of experiments in which we used intraperitoneal injections of the above amount of *B. enteritides*. Three strains were used: the stock "KM" strain, a strain isolated from the feces of banana-fed rats, and a strain isolated from the feces of cornstarch-fed rats. These strains had the same biochemical reactions, colony formation, and antigenic properties. Table VI shows that the banana and cornstarch-fed rats have equal susceptibility to the "KM" strain when injected intraperitoneally. The strains of *B. enteritides* isolated from the feces of the banana-fed rats and cornstarch rats had the same virulency as determined by intraperitoneal injections. In feeding experiments the strains isolated from the banana-fed rats' organs and feces had the same diarrhea producing properties when fed to cornstarch rats as the original "KM" strain. The same was

true for *B. enteritides* isolated from feces of cornstarch-fed rats.

Three weeks after *B. enteritides* intra-gastric administration to rats on banana diet, intraperitoneal injection of the minimal lethal dose of the same antigen caused death on the 3rd and 4th day. The same experiment carried out with cornstarch-fed, enteritides-injected rats produced death on the 7th and 8th day. This would indicate some protection in the cornstarch-fed rats as a result of their experience with this antigen. These results are not conclusive but may indicate some protection.

Heat stable Salmonella toxins and ox-bile (Arnold¹) were given by mouth to the banana-fed rats in order to increase their susceptibility to *B. enteritides*. These gastrointestinal irritants did not seem to disturb the animals inasmuch as no diarrhea developed and the organ cultures were the same as the control series.

TABLE VII

FIFTY MICE ON EACH DIET FOR 1 WEEK, THEN
FED *B. ENTERITIDES* AND OBSERVED
FOR 4 WEEKS

Diet	Per Cent Mortality
General stock	96.0
Cornstarch	42.0
Banana	6.0

The first of the series of experiments upon mice will be included in this paper. Our stock diet for mice consists of equal amounts of "puppy meal" and cracked corn. This has been used for a number of years in this institution for our stock mouse colony. Table VII gives the results of the use of 150 mice, 50 for each of the three diets indicated. After 1 week on these respective diets, the animals were given *B. enteritides* by stomach tube and observed for 4 weeks. The mortality of those on the stock diet was 96 per cent, cornstarch diet 42 per cent, and the banana diet 6 per cent. These experiments are being continued. This table is included to indi-

TABLE VI

Diet	Strain <i>B. enteritides</i>	Result
Banana	"KM" stock	Died 48 hours
Banana	Banana feces strains	Died 7-10 days
Banana	Cornstarch feces strains	Died 7-10 days
Cornstarch	"KM" stock	Died 48 hours
Cornstarch	Banana feces strains	Died 7-10 days
Cornstarch	Cornstarch feces strains	Died 7-10 days

cate that mice may be better animals for assay of these factors than rats.

DISCUSSION

Standard basal diets, with variations in the carbohydrate components, were fed from the standpoint of calories, protein, inorganic salts, and vitamins. The diet promoted growth, produced good pelts, and the behavior of the animals was normal as far as we could determine. The differences in the results obtained, after the *B. enteritides* feeding, was first thought to be due to an interference with the self-disinfecting mechanism (Arnold¹). But, inasmuch as the intra-intestinal distribution was the same in both series of animals, this did not explain the absence of diarrhea in the banana-fed animals. We next thought of decreased permeability of the intestinal wall as a factor. But, inasmuch as the organ cultures were approximately the same in both series of animals, this mechanism again did not explain the differences in these experiments. When banana powder is used for the carbohydrate source of our basal diet instead of cornstarch, rats have the power of physiologically adapting themselves to *B. enteritides* administered by mouth. The intra-enteric and organ distribution of *B. enteritides* is the same in both banana- and cornstarch-fed series. No resistance is enjoyed by the banana-fed rats 3 to 6 weeks after *B. enteritides* injection, although one-third to one-fourth of these animals are liver and spleen carriers of *B. enteritides*. Wasserman and Citron¹⁰ explain the increased protection enjoyed after local vaccination as due to a re-tuning of the endothelial system and a consequent increase in physiological response by destroying invading bacteria *in situ*. Inasmuch as the bacteria in the organs are the same in both series, this explanation would not hold in our experiments.

Gulbrandsen⁹ discussed before the

Laboratory Section of this meeting, a change of bacteria from viable to non-viable forms within the stomach and duodenum. He showed that these same non-viable forms could be rendered viable again under certain conditions. In other words, the active acid-secreting stomach has more of a bacteriostatic than a bactericidal function. There is a complicated biological change going on within the lumen of the intestinal tract. Bacteria are rendered non-viable within the acid-secreting stomach and are revived and made viable in the lower segment of the small intestine and in the large intestine. In our experiments so far, when these non-viable forms penetrate the wall of the intestinal tract and are cultured from the internal organs, they show certain biochemical and antigenic alterations from the original strain. We are now investigating this aspect of the protective action of foods against pathogenic enteric bacteria, in laboratory animals.

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Elements Involved in Determining the Qualifications of Health Officers*

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IN considering the factors, a term I prefer to elements, with which we are faced in any attempt to determine even the basic qualifications of health officers, we must remember that public health work and preventive medicine draw upon the whole sum of human knowledge; that measures used in the conservation of life and health rest upon a knowledge of the arts and natural sciences as well as upon medical science. Moreover, we must have in mind personal qualifications as the complement to professional ability, and that, lacking either personal or professional fitness, an individual is unlikely to succeed in the execution of an effective public health program.

It requires no close study to bring out the endless complexities that present themselves for consideration when an attempt is made to formulate standards applicable to single groups or classes of health officials. Imagine how much more complex the question becomes when the elements of population units to be served and governmental jurisdictions are added. Can the same set of standards be required for the health officer of a city of 50,000 as for a city of 5,000,000? Will similar requirements be made for federal and state governments as for a rural county of 20,000 population?

One may well approach the whole question in fear and trembling, and one may be very sure that in the end he must compromise the ideal with the practical for, if he places his theoretical ideal so high as to be unattainable, he will have defeated not only the immediate but the ultimate objective. In this connection, I recall the experience last spring of our Committee on the Qualifications of Local Health Officers of the State and Territorial Health Officers' Conference. On that committee are men of the widest experience in public health training in both technical and administrative work, yet reference to the minutes shows the first action of the committee to have been limitation of consideration to systematic training in professional qualifications, thus immediately excluding consideration of all personal qualifications. While the next formal action was a resolution favoring the development of professional standards for health officers as a necessary step in safeguarding the public health, the committee as its third action still further limited the field for consideration by confining discussion to the qualifications of *local* health officers in charge of counties, districts, or other communities having a population of less than 50,000. Within these quite narrow limits, the committee then proceeded to formulate the following qualifications as its idea of the basis upon which, in its opinion, health officers should be chosen:

* Read at a Special Session on Professional Education of the American Public Health Association at the Sixty-second Annual Meeting in Indianapolis, Ind., October 10, 1933.

1. That the candidate hold a degree of Doctor of Medicine from a reputable medical school, and be eligible to take the examination for a license to practise medicine in the state. A license, however, was not considered necessary except where required by law in individual states.

It is considered highly desirable that any candidate for appointment shall have had at least 1 year of clinical experience, including 3 months in pediatrics and 3 months in infectious diseases, gained preferably in a hospital of acceptable standards.

2. That the candidate be not more than 35 years of age when first specializing in public health.

3. That where practicable the candidate be required to have had special training in the theory and practice of public health as follows:

A. He should have had not less than 1 year in residence at a recognized university school of public health.

B. In addition, he should have had not less than 6 weeks of field experience under proper supervision in a local health organization.

4. Pending the development of a reserve of personnel with qualifications specified in Item 3, appointing officers at their discretion may accept (a) carefully selected personnel who have had, or who will spend, from 3 to 6 months in a local health organization which is in position to supervise a course of field training, and (b) personnel who have taken in a university a graduate course of instruction in public health of not less than 3 months' duration, 6 weeks of which shall be spent in a well organized local health department which is in position to give supervision.

5. That all persons holding the position of health officer at the time these standards are adopted by a state be required to meet the requirements specified in Item 4-B.

I believed then and I believe now that this method of approach is sound, for it seems to me the only way in which we may solve this question that has so long vexed our minds is by determining its elements and considering each element in its relation to the whole. We may, I believe, dismiss the

question of personal qualifications by requiring the highest standard of character and the ability to work with, as well as for, the people to be served. Except in posts of larger administrative responsibility where ministerial duties still further complicate the picture, these simple requirements should suffice.

The development of professional standards of qualification is, however, not quite so easy of solution. Here we must consider not only the varying size of population units to be served and other factors to which reference has been made, but also the varying per capita wealth that governs the capacity to provide public health service. I do not mean that the compromise of the theoretical ideal with the practical should be destructive of high standards but on the contrary that it should be a constantly moving standard, always approaching the ideal but never stifling growth and development of sound public health organization.

In this brief introduction to the problem concerned with factors involved in determining the qualifications of health officers, I have not attempted to point out nor to catalogue separately all of the many factors we shall have to consider. I have, however, tried to emphasize the need for a sane and practical approach in dealing with the question of securing more effective service through sound standards of qualification. That satisfactory results may be attained is supported by the experience of the Province of Quebec where almost all full-time health officers—even health officers serving the smaller rural jurisdictions—have had “not less than 1 year in residence at a recognized school of public health.”

An Epidemiological and Clinical Study of an Influenza Epidemic in a College Community*

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SINCE the pandemic of influenza in 1918-1920, sporadic cases have appeared constantly, epidemics have appeared focally and generally with almost cyclic regularity. Dublin reports in a study of mortality rates that a regular increase in deaths reported from influenza has occurred at approximately 3 year intervals since the war. An increase in influenza morbidity and mortality had been predicted for the year 1932-1933.

Influenza appeared in epidemic proportions during the fall of 1932 among college students at Stanford University. Although the attack rate was relatively low (7.2 per cent), the course of the disease fairly mild, and complications without serious consequence, there were certain interesting features of the epidemic which justify careful study and report. This was one of the first communities in continental United States to report on the appearance of influenza in epidemic proportions in the fall of 1932. It is frequently difficult to secure accurate records on influenza outbreaks in given population groups because of lack in uniformity of diagnoses and report on cases. It is much easier to se-

cure accurate reports on epidemic outbreaks in a college group. Central health supervision, uniform records and close contact with students make possible more comprehensive reports on epidemics. When students at Stanford University become ill they report either to their own physicians, directly to the hospital located on the campus, or to staff physicians in the offices of the Student Health Services. Students who are not seen in the Health Services at the onset of acute illnesses usually report there after recovery for the purpose of petitioning for leaves of absence for the period during which they were unable to attend classes. It is, therefore, possible to make contact with most students who have been absent because of illness, to establish with some precision the diagnosis of the disease and its complications, and to determine disability periods. The majority of students who became ill during this epidemic reported early to the Health Service where careful histories were recorded and where positive diagnoses of influenza were based on certain definite criteria acceptable to all staff physicians. A number of cases have been omitted from this report which ran mild or atypical courses. The report does not therefore represent the total number of probable cases, but only the total number of cases in which diagnoses could be satisfactorily established.

* From the Men Students' Health Service in the School of Hygiene and Physical Education in Collaboration with Dr. Walter H. Brown of the University Health Service and Miss Yvonne Fay, Public Health Nurse.

EPIDEMIOLOGY

Several scattered cases were reported during October. Early in November there was a sudden increase in cases reported by date of onset so that between November 6 and November 14 the incidence had reached the peak. From that date there was a rapid decline to November 19 and a second rise in incidence to a similar peak on November 21. Following this date there occurred a rapid subsidence of the epidemic. Chart I represents the incidence by date of onset beginning with the first case reported on October 6 and extending to December 6 when the study was terminated. The occurrence of the second high point in incidence cannot be explained except that on November 19 there was a general migration of students from the campus to Berkeley because of a football game. The second peak in incidence occurred 2 days after this game. The rapid increase in incidence and the more rapid decline is interesting. No special control measures were instituted except for early segregation of cases. Had such measures been attempted the incline might have been less rapid, the decline might have

been more gradual and administrative management would have been easier.

It has been difficult to determine with any accuracy either the spread through contacts or the incubation periods because of the close association between students in classrooms, dormitories, gymnasias, common eating halls, and in university gatherings. A study was made of contacts in several of the men's dormitories, but very little information was gained. It is nevertheless surprising to learn that room-mates of students who became ill rarely contracted the disease. In a study of incidence in a series of 89 cases who had room-mates, it was found that only 9 occupants of the same room became ill. In 7 of this number the room-mate came down with the disease between 48 and 72 hours after the other occupant of the room had become ill. This occurred in each case in spite of the fact that the first victim had been early removed from the room. This combined with the fact that the incidence rate showed definite increases within 48 to 72 hours after general university gatherings suggests that the incubation period is fairly short.

CHART I—INFLUENZA EPIDEMIC, AUTUMN, 1932
INCIDENCE BY DATE OF ONSET

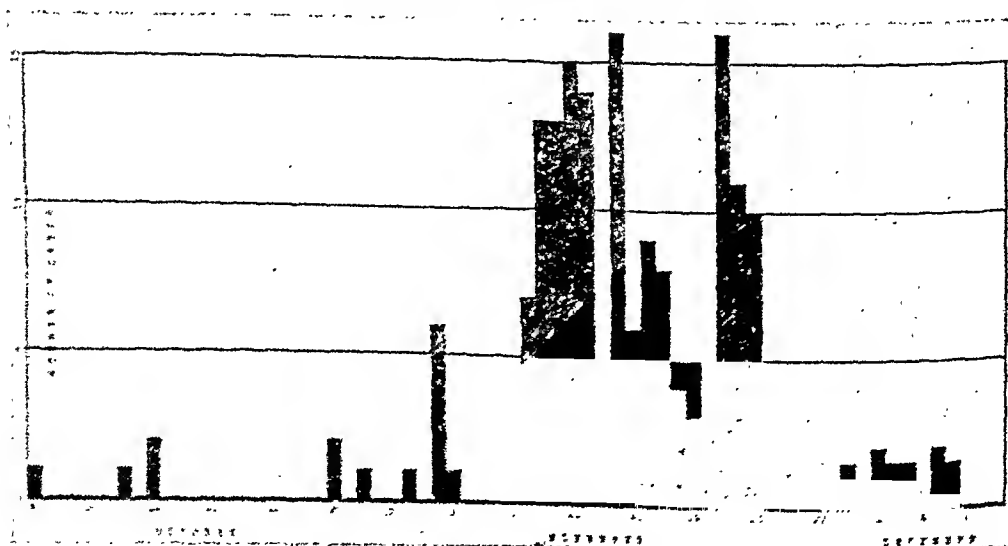


TABLE I
STANFORD UNIVERSITY
SCHOOL OF HYGIENE AND PHYSICAL EDUCATION
MEN STUDENTS' HEALTH SERVICE
INFLUENZA EPIDEMIC—AUTUMN 1932
SPECIFIC MORBIDITY RATES IN THE VARIOUS LIVING GROUPS

	En- cina	Bran- ner	Toyon	Se- quoia	Union	Roble	Fra- terni- ties	Sorori- ties	Cam- pus	Palo Alto	Other
Popula- tion	507	143	170	146	110	203	652	236	81	307	133
No. of cases	57	9	18	7	6	19	49	15	3	15	3
Attack Rates	11.2%	6.2%	10.5%	4.7%	5.4%	9.3%	7.5%	6.3%	3.7%	4.8%	2.2%

A study of incidence by age is limited because there is little variation in the age group studied. No figures are available to show the average age of all students in college, but statistics compiled by the university giving the average age of college matriculants entering during the first year, first and second year, third and fourth year, and in graduate standing give some light on the subject. The largest number of cases occurred between ages 20 and 21, but the disease was more frequent in students under 20 than over 21. Although the age spread is too small to be of particular moment, still it is significant that students of average graduate age were relatively free from attack. Many upper class and graduate students were on the campus during the epidemic of 1929. This leads one to suspect that the younger age groups may have been more susceptible. It is interesting to note that the first reported case was in a graduate student aged 22 and that no cases were reported in students over 25 years of age while the average age of graduate matriculants is 29 years and graduate students make up roughly one-third of the student population. In general, the earliest cases reported were first year students while

the disease later spread to upper age groups.

The 200 cases here reported include 41 women students. Since there are only 500 women students in the university, no comparison in attack rates by age is possible, but if it may be assumed that the total group includes similar numbers of reported cases and substantiated diagnoses in men and women students, the incidence was slightly higher in women students than in men students. The attack rate was 9 per cent for women as compared with 7 per cent for men. The incidence was somewhat higher in the lower age groups in women than in men, 46 per cent of cases in women being in the first year class. The highest incidence in women occurred between 18 and 19, as compared with 20 and 21 for the men.

Studies on the geographical distribution of the influenza cases revealed certain interesting facts. Most of the students attending the university live on the campus, either in dormitories or fraternities or in private rooms. A smaller number live in town or commute from nearby points. The relative morbidity rates in these various living groups is shown in Table I. This shows the number of students making

up each group, the number of influenza cases which occurred in each group and the attack rates by groups. It was found that higher morbidity rates occurred in the two dormitories occupied chiefly by first year students. There is no explanation for the high morbidity rate in Toyon Hall which is occupied by Sophomores, Juniors and Seniors, but most of the victims in this hall were sophomores whose average age was found to be slightly less than 20 years. No relation between general sanitary conditions of the living groups and morbidity rate could be determined. The relatively low attack rates in off-campus groups does not give quite a true picture of the situation since many of these students became ill after the campus epidemic had subsided and after the study had been terminated. The attack rate in this epidemic has been unusually low—the highest in any one living group being 11.2 per cent, the lowest, 2.2 per cent. The attack rate has been much higher in reports from other communities during this epidemic.

DISABILITY RATES

A relatively short period of disability characterized the epidemic. Disability is here defined as the number of days a student was forced by virtue of his illness to absent himself from his class-work. It does not include the rather long period of convalescence during which time the student was able to carry on at least part of his work. Nor does it include disability caused by complications. The epidemic produced a total of 882 student disability days during the 66 days included in the study. This means that an average of 13 students were disabled on each day of the study. The average period of disability was from 3 to 5 days and 91 per cent of the group were disabled from 2 to 6 days. The 3 cases which were disabled 11 and 12 days were patients who had recovered

from the first attack but who had relapses (without complications) before they were able to return to work. The total disability time was considerably prolonged through the superimposition of complications. Several students were forced to leave school for the remainder of the quarter because of complications, failure to recover from weakness, or because of delinquency in class work. Many were partially disabled through persistent complications, many suffered from common colds following influenza. While the actual disability time of influenza has been short, the total and partial disability resulting from complications and sequelae have brought heavy economic and health liabilities to its victims.

DIAGNOSIS

The clinical picture of influenza has been clearly described by various authors and the diagnosis should not be particularly difficult in the known presence of an epidemic unless the attack and course are unusually mild or unless the symptom complex is early confused with superimposed complications. It is nevertheless surprising how frequently the diagnosis is made on what would appear to be insufficient clinical evidence. There is a tendency on the part of physicians to over-diagnose the disease. Many cases of influenza would probably be diagnosed as common colds in the absence of an epidemic. The increase in number of acute upper respiratory infections which occurs coincidentally with influenza tends further to confuse the diagnosis and to decrease the accuracy of reports. A careful study of onset symptoms in order of their appearance, frequency of occurrence and severity and strict observance of the time of appearance and relative severity of localizing symptoms would reduce confusion in diagnosis and determine more accurately the chronology of complications. The

diagnosis of influenza should not be safely made in the absence of constitutional symptoms or when symptoms referable to the upper respiratory tract predominate from the onset.

An unusual opportunity has been presented in this study to reduce confusion in diagnosis, to establish with more than usual accuracy and with considerable uniformity the onset symptoms in order of frequency and severity and to observe clearly the appearance of complicating symptoms. Every effort has been made in studying this group to establish accurate diagnoses and our efforts have been facilitated by several factors which cannot always be secured in an epidemic study in less well controlled groups of the population. Most of the cases reported early so that accurate history of onset was made possible. The accuracy of histories was increased by the fact that patients were intelligent and coöperative, and because physicians were uniform in their methods of approach. Most of the cases were under observation in the same hospital where progress was followed daily by a public health nurse. Cases were

also watched uniformly through the period of convalescence. Positive diagnosis has been based upon the presence of a general constitutional reaction coming on suddenly or within 12 to 24 hours of the first complaint of not feeling well. This reaction usually included fever, prostration, headache, malaise, backache, and chilly sensations. It was commonly accompanied by localizing symptoms such as dry cough, sore throat, dry or obstructed nose, soreness of the eyes, nausea, and occasionally by vomiting and diarrhea. The finding of normal or lower than normal white blood counts with lowered polymorphonuclear elements or relative lymphocytosis further confirmed the diagnosis. The finding of leukopenia was found to be reduced in value because it is early changed by the superimposition of complications.

Occasionally the prostration was mild, fever was moderate, and there was little headache or general malaise; yet there were also no predominant upper respiratory symptoms, so that in the presence of an epidemic one would be forced to consider the diagnosis as

TABLE II

ONSET SYMPTOMS IN ORDER OF FREQUENCY AND SEVERITY, INFLUENZA EPIDEMIC, STANFORD UNIVERSITY, AUTUMN, 1932

Symptom *	—	+	++	+++	++++	+++++
Fever *	3	19	66	47	43	22
Prostration	8	49	69	70	4	
Headache	30	64	89	15	2	
Malaise	57	42	78	22	1	
Cough	93	85	20	2		
Backache	121	23	50	6		
Sore throat	124	75	1			
Chilly sensations	155	20	25			
Nausea	167	28	5			
Nose (Dry or Obstr.)	171	27	2			
Soreness of Eyes	172	28				
Diarrhea	177	14	9			
Vomiting	192	5	3			

* Symptom Code:

Absent = —
 Mild = +
 Moderate = ++
 Severe = +++
 Very severe = ++++

* Fever coded as follows:

Below 99° F. = —
 99.1-100 = +
 100.1-101 = ++
 101.1-102 = +++
 102.1-103 = ++++
 103.1-104 = +++++

influenza. These cases were few. More frequently confusion in diagnosis resulted from early appearance of upper respiratory symptoms superimposed upon mild constitutional reactions which might or might not have justified a primary diagnosis of influenza. Unless careful history revealed the definite constitutional reactions of influenza, such cases were diagnosed as upper respiratory disease. It is probable that certain cases of mild influenza with early upper respiratory complications have not therefore been included in the series studied. The study has been limited to 200 cases in which the data secured led to unchallenged diagnosis. Since the epidemic began soon after the opening of college and had practically subsided by December 1, only those cases occurring between October 6 and December 6 are included in the report.

Some cases when first seen were already complaining chiefly of sinusitis, bronchitis, or another upper respiratory condition; but most cases were seen early when the general constitutional reactions were at or near the peak. A careful study was made in the 200 cases forming this series to determine the onset symptoms with reference both to predominant complaint and relative severity. In order to secure more uniformity in reporting complaints in accordance with their importance both as seen by the patient and as observed by the physician we have made use of a simple code which is familiar to all examining physicians in the Health Service and which is used extensively in evaluating findings. Although such a code is valuable only to those who use it uniformly it gives simply and concisely a quantitative estimation of the severity and relative importance of symptoms.

Table II shows the chief symptoms at onset with frequency of occurrence in 200 cases and the relative severity as observed by the patient and by the

examiner. Quantitative estimation of severity is outlined in the key.

It will be observed that fever was the most common and tended to be the most acute symptom. It was present at onset in all but 3 cases. The onset temperature was most commonly between 100.1° and 101° F. but was more often higher than lower, in 90 cases being between 101.1° and 103° . Prostration was present in all but 8 cases. It was more often severe than mild, and in 4 cases was measured in almost complete collapse. The extent of prostration was not definitely related to the degree of fever, often those with moderate fever were very much prostrated. Headache was the next most common complaint. It was present in 170 cases and was more often slight or moderate than severe. It was usually frontal, but occasionally was coronal and more rarely (frequently associated with nausea) it was occipital. General muscle-joint aching or malaise was present in all but 57 cases. It was also described more frequently as mild than severe, usually moderate. Cough was present at the onset in about half the cases. It became more frequently a complaint as the epidemic advanced. It was almost always dry, hacking and irritative without expectoration. It was often associated with a feeling of tightness in the upper chest and the act of coughing was rather painful. Examination of the chest at this time revealed either no auscultatory changes or only harsh breath sounds heard over the roots or lung bases. Evidence of bronchial exudate was rare at this time. A symptom which occurred less severely and which was complained of less frequently was backache. It was offered as a complaint by 79 patients. "Sore throat" was one of the onset complaints of 78 patients. It was not an outstanding onset symptom, and examination revealed nothing beyond a generalized injection of the mucous membranes

of the fauces which usually extended down the posterior pharyngeal wall. No exudate was present. Forty-five patients complained of chills, or chilly sensations at the onset. Careful questioning failed to reveal that these were characteristic chills, but rather that the extremities felt cold and that the patient felt generally "chilly."

Only 29 patients complained of nasal symptoms. The usual complaint was that the nose felt dry and irritated or obstructed. Excess secretion was not present at this time. A number of patients complained of soreness of the eyes. Others who did not offer this as a complaint were observed to shield their eyes from the light. Slight injections of the conjunctivae were common findings in these cases. Gastrointestinal symptoms were fairly common. The usual onset symptoms in several cases were preceded 12 to 24 hours by an acute enteritis with nausea, vomiting and diarrhea, usually without cramps and without fever. The condition presented a picture of so-called acute food poisoning. About the time this condition began to improve, acute prostration, fever, malaise, etc., supervened. In other cases the intestinal symptoms coincided with onset of fever, prostration, etc. Nausea was the most frequent gastrointestinal symptom, but this is frequently associated with sudden high fever and so is found out of order in the list of gastrointestinal symptoms. In this connection it is interesting to note that the California Public Health Reports showed an increase in cases of food poisoning coincidental with the increase in cases of influenza at that time.

A review of onset symptoms reveals the fact that onset is usually associated with a general constitutional reaction—fever, prostration, headache and malaise, in that order of frequency and severity; that the most common localizing symptom was cough, which was

more frequently a complaint during the later period of the epidemic, and was always an early complaint in those who later developed bronchitis or pneumonia; that at onset it was dry, hacking and often painful. Sore throat, though a common localizing onset symptom was found on examination to be due to a general pharyngeal injection. Gastrointestinal symptoms were rather common onset or even precursory symptoms which deserve more thorough study since they often tend to confuse the early picture.

COMPLICATIONS

In 81 cases included in this study the acute constitutional reaction and localizing symptoms were not followed by findings leading to the diagnosis of complicating disease. Although this number is relatively small the fact that uncomplicated cases occur should lessen the confusion in diagnosis and make easier the description of influenza as a clinical syndrome. In these cases the course was rapid, duration was short, and the convalescent period was brief, so that one is led to believe that influenza is not a serious disease *per se*, but that morbidity and mortality are increased because of complications.

The most common complications in this epidemic have been acute bronchitis and acute sinusitis or a combination of the two. Such diagnoses were made following influenzal onset in 43 cases. Such cases have been largely responsible for the prolonged disability period and slow convalescence. Acute tonsillitis occurred as a complication in 6 cases, and acute otitis media appeared in 5 cases. One case of acute cystitis and one case of focal arthritis occurred either coincidentally or as complications. In 2 cases the onset symptoms were shortly followed by the appearance of dry pleurisy, one of which developed pneumonia. Broncho-pneumonia is a common complication in epidemic in-

fluenza. It occurred in 11 cases in this series, was fairly mild in all but 3 patients who became critically ill. It was a more common complication of the later period of the epidemic, as was acute bronchitis, and the 3 critical cases of pneumonia, all became ill from influenza during the last week of the epidemic study.

SEQUELAE

Relapse occurred in 2 cases with a primary disability period and in 2 after return to classes. A large number of patients after recovery from influenza suffered from common colds. Among other sequelae must be mentioned the marked lowering in the threshold to fatigue, residual tachycardia, night sweats, anorexia and general muscular weakness. Three students were forced to discontinue their school work because of marked weakness of extra-ocular muscles. Six were unable to finish the school quarter because of the persistence of marked general weakness.

SUMMARY

The appearance of influenza among college students at Stanford University in the fall of 1932 presented an opportunity for studying intimately the disease in its epidemic form. Conditions were unusually favorable for such a study since the health supervision in the college community is centrally controlled, most of the cases have reported early, have remained under observation during the course of the disease and during convalescence, and incidence, geographic distribution, and disability were easily determined. It was possible to establish diagnoses with greater accuracy than is often obtained in an epidemic study, since certain definite symptomatic criteria have been set up for the purpose and observed uniformly by members of the medical staff. Because of careful histories and the re-

porting of symptoms by time of appearance, frequency and severity, it was possible to contribute further to those criteria upon which the diagnosis of influenza should be founded. Finally, it was possible by the same methods to identify the complications in order of frequency and importance. Although a slightly larger number of cases was reported, 200 cases were selected for the study, the selection being based on accurate reports, unchallenged diagnoses, and complete follow-up study. The epidemic reached its peak very rapidly, then after a short period in which the number of reported cases diminished there appeared a second peak. This was followed by a rapid and final decline. The height of the epidemic occurred between November 6 and 27. Very few new cases were reported after that time. The importance of spread through contact could not be determined with accuracy, but there were surprisingly few instances where room-mates of victims were affected, and there appeared to be some relation between university gatherings and increase in reported cases. From the latter observation and the study of the occasional room-mates who were affected, it appears that the incubation period is short, probably usually 48-72 hours.

The attack rates were definitely higher in the lower age groups. The incidence was highest in occupants of first year dormitories and in sophomores living in other dormitories. The incidence in students of average age of graduate standing was surprisingly low. The incidence was slightly higher and the disability period was slightly longer in women students than in men students. The total disability caused by the disease was rather low and the average disability period per student was relatively short—in 91 per cent of the group the period of disability was between 3 and 5 days. Confusion in

diagnosis occurred chiefly in the occasional mild cases and when complications occurred early in the course of the disease. A careful study of symptoms at onset in regard to time of appearance, frequency of occurrence and relative severity has assisted greatly in

reducing this confusion. Complications were very common and the total and partial disability resulting from complications and sequellae was high, producing much greater economic loss and impaired health than was caused by influenza *per se*.

Maternity Benefits from Public Sources—Sweden

MATERNITY aid from public sources was first introduced by way of experiment in four provinces of Sweden during 1931, but within the next two years it was gradually extended to the entire country. This aid is given to women members of social-insurance funds and to noninsured women. In the case of insured women the insurance funds are required to pay maternity benefits, for which they are later reimbursed by the national treasury. Formerly the payment of maternity benefits was optional. The benefits amount now to 2 kronas daily, instead of 1 krona (par value about 27 cents) as formerly, and are paid for a period of 30 to 56 days, instead of 14 to 42 days. In addition free attendance by a midwife or hospital care is now provided.

The new regulations governing the sickness insurance funds also permit a nonemployed woman to become a member for sickness insurance only. At the time of childbirth such a woman is entitled to free attendance by a midwife and to maternity benefit of 2 kronas daily for at least 30 days. Since the premiums for this kind of insurance amount to less than a half krona a

month, a woman of even small means may obtain the above benefits.

The most significant feature of this new system of maternity aid is, according to the students of social welfare in Sweden, the provision of maternity aid to noninsured women, whose income is below a certain amount. It has been calculated that out of the 93,000 annual cases of childbirth in Sweden 70,000 belong in this category. The aid is 1 krona a day paid for a minimum of 30 days, and for 56 days in the cases of women employed in industries protected by the labor code. No free attendance by a midwife is provided to noninsured women.

Application for maternity benefits must be made at least 60 days before the expected birth of the child. The purpose of this requirement is to enable the disbursing organization to give the woman prenatal advice and, if necessary, make arrangements for her care during pregnancy and confinement and for the care of the child. Plans are being made for coöperation with child health centers and similar organizations.—*Tidskrift för Barnavård och Ungdomsskydd*, Stockholm, No. 1, 1934.

Standard Blood Agar Plate in the Control of Scarlet Fever*

Experience of a Rural Health Unit

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IN 1929 blood agar plates were introduced by Dr. C. D. Barrett in the work of the Lorain County Health Department in the control of scarlet fever. This study reviews our experience with these plates from January 1, 1931, through August, 1933. In this time we had 339 cases of scarlet fever, 751 suspects, and 16 cases diagnosed as septic sore throat. How we used blood agar plates and our conclusions as to their usefulness is told in this paper.

Ours is a district health department in northern Ohio serving a county of 40,000 people scattered over 10 villages and 20 townships in an area of 476 square miles. It is a department of moderate size, with a full-time health officer, 3 nurses, a sanitary officer, a laboratory man, and a clerk. The laboratory man is also the milk inspector. Our laboratory is a small room, 9' x 14', but we make the ordinary bacteriological determinations, except for Wassermanns.

When a case of scarlet fever is first seen, a throat culture is taken routinely, from both tonsillar regions if possible. In the laboratory sterile normal saline is poured into the tube, covering the swab. The tube is shaken and set aside. To a tube of ordinary melted

agar cooled to 40°-42°C. a loop of the saline suspension is added, then 0.5 c.c. of beef blood (preserved with citrate in the refrigerator). The whole is rolled, then poured into a plate, and incubated. After approximately 18 and 42 hours the plate is examined for the characteristic colonies of the hemolytic streptococcus, beta type. Release culture were taken 18 days after the onset. If positive, still other cultures were taken until negative.

We have had no epidemics of scarlet fever, but have shared the general increase which most of Ohio has experienced. The table deals with 103 cases in 1931, 151 in 1932, and 85 in the first 9 months of 1933. This is an annual morbidity rate of 306 per 100,000. Cases have been quarantined on the diagnosis of practising physicians or of the health commissioner.

TABLE I

Early culture (when first seen) positive	165
First culture negative, a later culture positive	38
First culture negative, later cultures negative	53
First culture negative, no release culture shown	15
No early culture taken, later culture positive	17
No early culture taken, later culture negative	27
No cultures recorded at all	24
Total cases cultured	315

*Read before the Laboratory Section of the American Public Health Association at the Sixty-second Annual Meeting in Indianapolis, Ind., October 17, 1933.

Of the 339 positive cases of scarlet fever dealt with, Table I summarizes the results of cultures:

Of the 271 cases with a culture within a week of onset, 165, or 60.9 per cent, gave a positive culture. Of the 106 negative at first, 38 were later positive. Special effort to reculture early negatives was seldom possible, or more positives would probably have been obtained. Of the 44 who had no early culture, 17 were later positive. Thus of the 315, 220, or 70.2 per cent, were positive at some time.

We made some study of the symptoms accompanying scarlet fever. In 188 cases in which report was made, peeling occurred in 161, or 83.0 per cent. Of the cases whose cultures were always negative, 34 peeled, 9 did not. Of those who peeled 104 (66.7 per cent) had positive cultures at some time, 52 were negative, and 6 had no cultures recorded. In 168 cases there is a definite statement on the question of vomiting. This occurred in 111 cases, or 66.1 per cent.

Most of our cases of scarlet fever were quarantined without reference to the culture, but frequently in doubtful cases we waited for a positive culture and considered it so much additional evidence. It aided when the rash was very faint, or hard to distinguish from other rashes.

The culture was uniformly employed when the question of release arose. Ohio now quarantines at least 21 days for scarlet fever. At 18 days after the onset we took a throat culture. If negative, the patient was discharged at 21 days. If positive, the culture was repeated until negative. Usually the throat cleared up rapidly. A continued positive culture was almost invariably associated with enlarged tonsils or enlarged cervical glands. An otitis media would give a positive culture as long as the discharge continued, long after the throat was negative. One high school

boy developed a maxillary sinusitis following scarlet fever and a supra-orbital abscess. Cultures from the throat became negative, but those from the nose and the incised abscess cavity continued positive until the supraorbital wound healed.

We used the cultures quite widely in examining suspects. If scarlet fever appeared in a class in school, the other pupils in the room were examined. Those with sore throats or those arousing suspicion in other ways were cultured. Sometimes a positive culture, added to a suspicious tongue or an almost faded rash, made a diagnosis possible and the child was quarantined. In other cases while the evidence was not conclusive enough to call it definitely scarlet fever, the child was excluded from school as a probable carrier until his throat became clear. We made no study of the virulence of organisms found in the throats of such carriers.

In all cultures were made in 751 suspected cases, aside from those quarantined. Of these 181, or 24.1 per cent were positive. Some of those negative might have proved positive on reculturing, but by imposing some degree of restraint on those found positive, we lessened considerably the number of scarlet fever organisms in circulation. It is noteworthy that of the suspects 40 showed some degree of peeling. Of those peeling 15, or 37.5 per cent, had positive throat cultures. Quite possibly we should have quarantined them. By way of comparison, 46.3 per cent of the quarantined cases who peeled had one or more positive release cultures.

Cultures in suspicious cases encountered late in the disease were especially valuable in differential diagnosis. A child with a running ear and a history of a cold and a rash some weeks previously might have had measles or scarlet fever. If the culture showed hemolytic streptococci of the

beta type, we were inclined to consider it scarlet and isolate.

A boy with an infected finger developed an axillary abscess. Later a general punctate eruption appeared. The abscess yielded *Streptococcus hemolyticus*, beta type. The throat was never sore. Here we had scarlet fever resulting from an invasion of the body by way of the finger instead of the usual avenue, the throat.

In 1930 a farmer had a blistered finger, which developed a severe infection of the finger. Culture of the incision showed *Streptococcus hemolyticus* beta. In 3 days scarlet fever appeared in 1 child, who died. Two other children also had scarlet fever.

A baby developed influenza, then empyema, and later a general punctate eruption. The throat never showed hemolytic streptococci, the pleural cavity did so consistently until it healed. The child peeled.

A boy treated in a hospital for extensive burns on the leg developed scarlet fever. He was taken home, where he recovered from his scarlet fever. His throat culture was negative and he was released. Three weeks later another child in the household developed scarlet fever. The burned boy's throat was again positive, possibly from the reservoir in the leg. After his throat became negative, he was held until his leg was healed. No further scarlet fever appeared.

Cultures were of value in still another throat condition. Severe sore throat is found fairly often, without rash or strawberry tongue, with positive beta type cultures. Almost by definition these are septic sore throat. Sometimes they are clinically mistaken for diphtheria. In such cases we run both a Loeffler slant and a blood agar plate. We would point out that both can be positive in an individual; in one of our cases it took a virulence test to show that it was not diphtheria, but septic sore throat. To a health department doing general milk work it is of special value to know whether a sore throat in the family of a milk dealer is of the septic-sore-throat-scarlet-fever family or not.

CONCLUSION

It is in locating the suspicious or sub-clinical case of scarlet fever, or in differentiating it from confusing diseases that we have found these blood agar plates most valuable. We do not consider them absolute.

Much remains to be understood about this organism, its exact relationship to scarlet fever, its occurrence in the ordinary population, etc. But by considering the results of these cultures as part of the total evidence in each case, we are sure that we have been greatly helped. We would recommend the procedure to other small health departments.

Medical Supervision in the Public Schools*

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WHAT are the functions of the School Medical Staff? From the medical point of view the answer may be given in one word—prevention. A general campaign is carried on to prevent the spread of contagious and communicable diseases. The pupils are examined in an attempt to prevent possible defects from becoming manifest and actual defects from getting worse. The aid of the parent and the private physician is sought for both preventive and remedial measures. Handicapped children are given special consideration. Employees and pupil candidates for working papers and athletic contests are examined. No actual therapy is carried on in the schools. There is so much in the program of preventive medicine that at no time should it be necessary for a school physician or nurse to partake of any actual therapeutic procedures except, of course, to render first aid in emergencies.

From the school viewpoint the functions of its medical staff may be summed up in one word—education. The pupils are taught the value of the periodic health examination and the importance of the correction of any defects found. Care of the eyes, ears, teeth, heart, lungs, nervous and skeletal systems are stressed. The importance of proper sanitation, hygiene, fresh air, sunshine, cleanliness, proper food, ex-

ercise, rest and good posture are emphasized. Supposed mysticisms of medicine are exposed, making the pupil more health conscious. He becomes receptive to proper medical care and attention. Just as bad health hampers education, good health aids it. Boards of education have realized the value of this to the extent that some states have passed laws making medical supervision compulsory. There are 38 states that have laws requiring or permitting employment of medical inspectors.¹ Actual statistics show that the pupil of today is sturdier, taller, and healthier than his more frequently rachitic parent. This may properly be attributed to health education.

In actual practice, how would such a program embodying all the above factors work out? From a practical point of view, the best idea of this school medical service can be secured from an annual report showing just what was done for the year. Certain items not particularly stressed during the given year would necessarily be omitted.

The *Annual Report* of the Albany Public School System for the year beginning September, 1932, and ending June, 1933, is summed up as follows. The city was arbitrarily divided into 4 districts; cosmopolitan, working class, residential, and high school. Each district was further subdivided into nurse group sections. The latter sections were made up of the individual schools. We may go further and subdivide the schools into the grades and the grades

* An analysis based on the Annual Report of the Department of Medical Supervision of the Albany Public Schools for the year 1932-1933.

into the individual pupils. With such a system we may realize how easy it is to note a particular phase of health referable to any pupil, any class, any school, or group of schools, in any district or in the city as a whole.

VISIBLE RECORDS

A visible and signalled health card system is used.² Different colored signals are used. The red signal signifies that a defect has been notified but not placed under treatment; blue that the defect has not been notified; yellow that the defect has been placed under treatment; purple that the defect has been operated on; and the black and white striped that the defect has been cured. There is a constant campaign to "Keep out of the red," red being the danger signals of untreated defects.

PERIODIC HEALTH EXAMINATIONS

Every pupil is examined once a year. Pupils will grow up with this periodic health examination habit which will continue throughout the remainder of their lives.

DEFECTS FOUND

The average for all the schools was 72 per cent, 8 per cent less than 2 years ago. Also 2 years ago there were almost $1\frac{1}{2}$ defects per pupil while this year there were about $\frac{2}{3}$ defects per pupil.

The schools in the cosmopolitan and working class sections of the city had the highest percentage of defects, the average being about 80 per cent. In the residential sections the defects found dropped to about 65 per cent. In the high schools the average was 60 per cent.

NUTRITION

All the pupils were weighed and measured; malnutrition was found in 672, or 4.6 per cent. The question of nourishment, particularly undernourish-

ment, has been stressed during these periods of depression. It may be said that the cases of undernourishment found were readily taken care of by the City Welfare Department, the schools themselves, or various private welfare agencies. The actual number of undernourished cases was at no time much higher than is found under normal conditions.

Nearly all schools had milk supplied either from private or donated funds. As a matter of fact, of the 672 cases of malnutrition, 419 were undernourished and 253 obese. Albany's percentage of undernourished is low in comparison with most other cities of its size, many having malnutrition rates as high as 20 and 30 per cent. The curve for malnutrition, as noted on Graph I, shows that no definite area of the city is particularly involved.

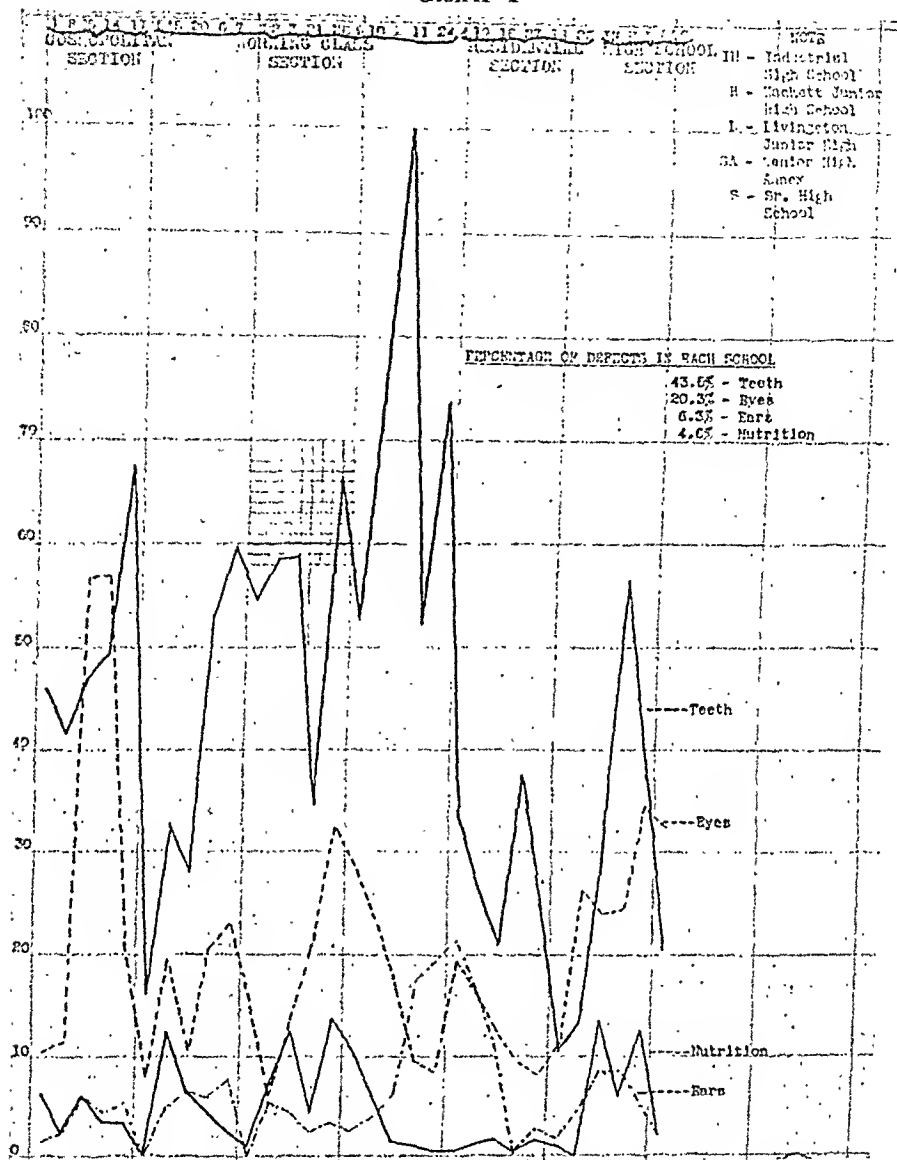
In estimating malnutrition the cases found were based on individual examination of the pupil rather than an attempt to standardize a child with some age, height, weight table. This is in accord with the State Department of Education and the Commissioner of Education of the U. S. Department of the Interior. The latter says: "No two children are alike and no two children can be made to follow one pattern of growth. The child should be compared with himself and not with the average child."³ In the open air classes, which are the only ones in which age, height, weight tables are kept, each child has his own chart and compares only with himself.

TEETH

This curve (Graph I) showed that 43.5 per cent of the pupils had teeth defects. This is 7 per cent less than 2 years ago.

The 2 school dentists examined and cared for 1,449 needy pupils. Fifteen appointments are made for each dentist each morning from 1 nurse group of

GRAPH I



schools. The 2 dental hygienists examined 1,759 pupils and gave prophylaxis (cleanings) to 2,621.

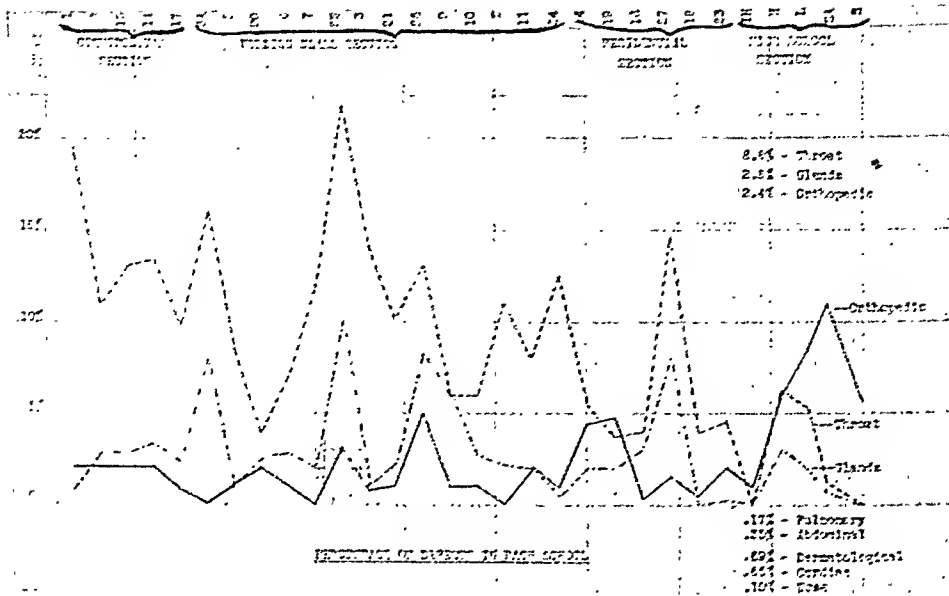
EYES

All the pupils had their eyes tested. There were 2,834 pupils (20.3 per cent) with eye defects (Graph I). This compares favorably with most other communities. Most authorities find 1 in every 5 have a visual defect. The local ophthalmologists disclosed that over 90 per cent of the pupils referred to them for visual defects required care and attention.

The percentages of pupils with abnormal vision showed that most of the visual defects are of the 20/30 type, this being the least manifestation of visual error and the most remedial.

Formerly the eyes had been tested by means of the Snellen Chart under varied conditions of illumination in the different schools. An average of 4½ minutes was required for each pupil. With our newly devised eye test cabinet, an average of only 1½ minutes was required. This cabinet has proper illumination. It is placed on the nurse's desk which she does not have to leave

GRAPH II



at any time during the examinations. Teachers and pupils aid in a monitor system.

A survey disclosed 53 possible sight saving candidates for all grades. Of these, 36 were in the junior high school grades. These had 20/70 or worse in both eyes. Adjustable desks and seats, special large type typewriters, large type texts and other new equipment were supplied the sight saving classes.

EARS

Audiometer hearing tests were given to all pupils from the third grade through senior high school. The tremendous economic importance, not only to the health of the pupils but also as far as teaching and education are concerned, of these hearing surveys and treatment of defects found may readily be seen.

The 4A tests and retests were done by the nurses. The 2A tests were done by the school physicians.

Pupils in each classroom were divided into 4 groups. Those with normal loss of hearing, from 0 to 9 per cent, were placed in the rear of the classroom. Pupils with borderline defects ranging from 10 to 15 per cent were

placed next in front. Those having definite defective hearing of 16 per cent or over were placed still further front, while the front now contained those who had the poorest hearing.

There are 2 lip reading classes, 1 in the night schools and 1 held Saturday mornings for high school pupils.

Each teacher was given a list of her pupils showing how to group and seat them advantageously with reference to their hearing. A similar classification was arranged for vision.

THROAT AND GLANDS

Graph II shows that 8.8 per cent of the pupils have throat conditions which are essentially affected tonsils. This is 7 per cent less than 2 years ago. Two and two-tenths per cent have gland defects, essentially cervical or neck glands due to affections of the tonsils.

ORTHOPEDIC

Two and four-tenths per cent of the children have orthopedic defects (Graph II). These are chiefly flat feet, round shoulders, and other postural defects.

There are 2 teachers in charge of the orthopedic classes in the Child's Hospital. In addition there are 2

teachers giving home, other hospital, and bedside teaching. A swimming class for crippled children is being formed with the aid of Dr. Walter Craig, State Orthopedist.

HEART

A survey was made in all the schools to find how many heart cases there were, what types, and what should be done medically and from the school standpoint. It must be remembered that heart affections still cause more deaths than any other single condition, and that the percentage of people dying from heart conditions is increasing. Proper preventive procedures may be carried out so as to avoid more serious disabling consequences and to permit each pupil to be better fitted for his school work. The survey was made in accordance with the standards established by the American Heart Association.⁴ The routine for each pupil included at least a complete history, physical examination, cardiac examination, blood pressure, spirometer test, and cardiac functional test.

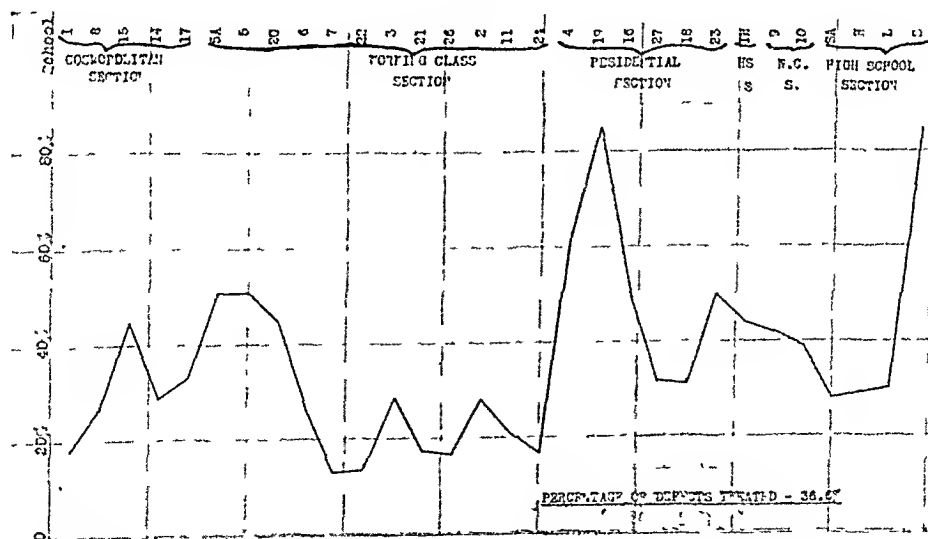
The survey disclosed 122 cardiac cases or 0.6½ per cent of the pupils, 55 boys and 67 girls. The causes in

order of frequency were rheumatism, tonsillitis, congenital, scarlet fever, whooping cough, chorea, measles, influenza, bronchial asthma, and too rapid growth.

Three-fourths had mitral regurgitation, while almost one-fourth had the more serious stenosis of the valve. There was 1 case of regurgitation of the aortic valve and 1 case of general endocarditis.

In order to classify these cases as to functional ability so as to determine what the child could or could not do physically, each was given a cardiac functional test. Some were permitted mild physical exercise while others were excluded entirely from physical or manual training classes. The survey for functional ability showed that 46 per cent of the cardiac cases had to have their activities slightly limited; 35 per cent could carry on the ordinary activities, being careful to avoid undue strain. This is important in that it shows that not every individual with a heart condition must be made an invalid. These latter cases, however, need repeated examinations and observation. Six per cent of the cardiac cases require considerable curtailment

GRAPH III



of activities. There were no children in the schools with organic heart disease who were unable to carry on any activities without discomfort as such cases would be confined either to the home or to the hospital. Seven per cent of the cardiac cases were possible cases of heart disease, that is, pupils who showed abnormal signs or symptoms referable to the heart but in whom the diagnosis of heart disease was uncertain. There were 6 per cent of the cardiac cases designated as having potential heart disease, whom it was advisable to follow because of the presence or history of a causative factor which might bring about heart disease. The distribution of heart cases was approximately the same for all sections of the city.

NOSE, DERMATOLOGICAL, ABDOMINAL, PULMONARY

All these amounted to less than 1 per cent.

DEFECTS NOTIFIED

Ninety-two per cent of the defects found were notified. This is in keeping with the general program of prevention where the slightest possible defect may result in most serious consequences so that all parents as nearly as possible are notified of defects found.

DEFECTS TREATED

This curve (Graph III) showed that 36.6 per cent of the defects were treated, or 3 per cent more than 2 years ago. This is the most important chart. The number of children examined, the number of defects notified, and other health procedures are of little value unless the conditions found are actually treated or placed under observation by the private physician. The more defects taken care of the better fitted are the children to pursue their studies.

The highest percentage of defects treated, 85 per cent, was in the Senior

High School. The schools in the residential sections were next; then the cosmopolitan and working class sections. The remaining schools ranked between 20 per cent and 50 per cent.

ABSENCES

Seven per cent of the pupils were absent for all reasons during the past school year; 3.9 per cent of them for illness.

The highest percentages of absence due to illness as compared to the total absences were in the residential sections where 1 school had as high as 95 per cent. The high percentage of absence due to illness in the residential sections may be due to the fact that the children are kept out of school for lesser ailments. As has already been noted, the percentage of pupils with defects treated is also comparatively high in the residential sections.

The most common conditions for which pupils came to the nurses were, in order of frequency: colds, headaches, stomach and other abdominal complaints, toothaches, skin conditions and injuries. Colds account for about one-half of all absences for illness.⁵

ANTIDIPHThERIA CAMPAIGN

Schick tests disclosed that almost 25 per cent of the children were naturally immune to diphtheria and required no inoculations: 74 per cent are inoculated against diphtheria. Pupils are urged to go to their private physicians for immunization.

HEALTH EDUCATION PROGRAM

A health education program, aside from the periodic health examinations and the instruction with reference to prevention of disease and caring for defects found, included the distribution of health bulletins on hearing, vision, measles, diphtheria, periodic health examination, whooping cough, first aid, the use of the audiometer, etc. This

program also included teaching of health habits through individual contacts with pupils, teachers, and parents.

SANITARY SURVEY

The newer schools have modern up-to-date methods of sanitation and in the older type of school buildings the conditions are kept as satisfactory as possible.

TEACHERS EXAMINED

There were 20 teachers examined. Low blood pressure and poor vision constituted the main group of physical defects among the teachers.

WORKING PAPER EXAMINATIONS

There were 1,141 examinations made; 1,069 children were granted unlimited permits; 20 limited permits; and 52 were refused or had their permits deferred.

RINGWORM

Two years of bacteriological investigation to substantiate our clinical findings have been completed by Dr. Harold Feigenbaum, in charge of Chemical Laboratories at Rensselaer Polytechnic Institute. A powder containing 80 per cent boric acid and 20 per cent sodium thiosulphate is still being successfully used. The less practical footbaths of 15 per cent sodium thiosulphate have been discontinued.⁶ In a recent article⁷ it was noted that most schools and health centers in the country have adopted fungicidal procedures similar to those used in the Albany public schools.

TUBERCULOSIS

Conferences were had with the Albany County Medical Society urging them to initiate an antituberculosis campaign in the schools. The Vaughan Plan was recommended so that the pupils could go to their private physicians for tests and examinations.

SUMMARY

The duties of the school medical staff are twofold, medical and educational,⁸ and these are mostly interchangeable.

The medical phase of the work is one entirely of preventive medicine. The pupils receive annual periodic health examinations by the private or school physicians. An attempt is made to have all defects corrected by the private physicians and to have all the pupils vaccinated against smallpox and inoculated against diphtheria. Campaigns are constantly carried on to prevent the spread of contagious and communicable diseases. Special examinations and considerations are given to handicapped pupils, to candidates for athletics, and for employment certificates. Employees of the school are examined. Other than for emergent first aid—absolutely no therapy is given.

The educational part of the program calls for health instruction, particularly individual or in small groups. Important matters considered are the periodic health examinations and correction of defects, care of the various parts of the body, and sanitation and hygiene. The school is made to fit the pupil as much as possible from the health standpoint. A healthy child, a healthy teacher, and a healthy school environment is the ideal combination sought.

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The Use of Laymen in Official Public Health Nursing Programs*

CITY

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WE are all prone to say that health is a matter of education. How shall we interpret this rather loosely used phrase? Some regard it as an advertising of the health department in order to create a favorable attitude toward it. Others look upon it as an accumulation of academic data on health stored away but little used. Still others consider that each individual in the community must play his part in changing attitudes and ways of living to those which make for health if health is really a matter of education.

"The informed citizen takes an advanced course in public affairs by becoming an educator himself in his personal contacts and through local civic associations," Courtenay Dinwiddie of the Commonwealth Fund says in commenting on public health and public opinion.

It is interesting to scan the history of the use of lay people and the influences which have given impetus to a fuller appreciation of their part in the program for community health, more particularly as they relate to public health nursing.

Some of us have had an opportunity in certain communities to observe a shifting of responsibility for home care of the sick from the non-professional to

the professional groups. Then, we later may have had an opportunity to observe a slowly dawning realization of the lost values in the assumption of the whole program by the professional group and a consequent revision of program which includes both professional and non-professional, resulting in a nice division of responsibility.

Public health nursing had its inception in visiting nursing. Visiting nursing has had a strong emotional appeal to lay people. The care of the sick poor in their homes by visiting nurse organizations was sponsored by lay groups. Public spirited citizens fostered the work of visiting nurses until the community was convinced that public moneys should be used for the preventive aspects of the visiting nurse service. Since the lay boards of these organizations were often particularly concerned with the raising of funds, interest in the work under the official agencies sometimes lapsed when there was no longer need for the type of service formerly given. Perhaps a further cause of the non-use of lay groups in official agencies was an attitude of resentment of any "interference" on the part of some of the older staff members. This attitude reacted detrimentally upon any sporadic interest which might have been evidenced by any lay person or group.

Public health workers have been interested in the development of a broad

* Read before the Public Health Nursing Section of the American Public Health Association at the Sixty-second Annual Meeting in Indianapolis, Ind., October 11, 1933.

health program founded on scientific principles, perhaps losing sight of the need for a sound educational program which includes Mr. and Mrs. Everybody in the community. There was an attitude with some of the workers that "this was *our* job and the public depends upon us to do it," and they have been slow to acknowledge the values of service and interest from the non-professional group.

Conditions of the past few years in the public health field have brought us face to face with reality. Municipal treasuries are low; tax payers seek a way out; appropriating bodies are prone to cut their budgets where there will be least pressure from influential political groups. And we have suffered.

Looking back upon the records of health departments as they struggled under the stigma of city hall influence, there is little wonder that it was not desirable to invite the close scrutiny of the community's citizens. There is little wonder, too, that it was in the unofficial public health nursing organizations that high standards of work were set.

With the development of earnestness of purpose, of a real desire to render to the public, nursing service of quality in official public health nursing organizations, we now want to be understood; we now know the need of an informed public; we now know that an understanding public means protection of the thing we have builded. Too, we know the inherent possibilities for a finer understanding and appreciation of the rapidly growing official nursing services. So much for a story of changing attitudes and widening perspectives.

Now that we have discovered that we need each other, how may we create interest in the lay groups and then direct it toward useful ends? Each city will find, in various established groups, a lively sympathy and curiosity about

what is going on in the health field. What we would do, is to reach this fine spirit of helpfulness, organize, inform, and direct it into regular, orderly channels which are so much in need of help.

The Federated Clubs and Parent Teacher Associations have health sections. They may serve as rallying points. The Chamber of Commerce has its public health committee; Junior Leagues are particularly helpful aides; church groups find certain phases of the service challenging. One city reports a continuous diphtheria prevention campaign carried on by the American Legion. The luncheon clubs, Rotary, Kiwanis, Civitan and others have projects closely allied to the field of public health nursing.

When interest is aroused, latent ability for leadership must be detected, and scattered interest crystallized into action. I like to think of the logical stages through which the organization of lay groups moves: (1) There is participation in a broad educational program, learning something of the community's needs. (2) We would expect participation as a volunteer in some of the activities which are set up to meet these needs. One of the recommendations of the Welfare Committee of the Junior Leagues relating to volunteer service states that "one of the ultimate objectives of volunteer service should be to qualify for intelligent board membership in welfare agencies." (3) We would expect a selection of leaders to be made from this group of volunteers to act as members of an advisory committee. In this committee would be developed a broad social vision which it will, little by little, interpret to its community.

Let us illustrate the steps through which a city bureau may go in order to secure lay interest and direct the activities which are the logical outcomes of such interest.

A department of health in one city without a visiting nurse organization, realizing its need for greater lay interest in the whole public health program, found a real desire for fuller knowledge of what was done to protect the community's health in the District Health Chairman of the Federation of Women's Clubs. A plan was laid for monthly meetings at the department headquarters, bringing together the health chairmen of some 60 local clubs for study of local problems. They learned of the activities carried on in their community to meet these problems and of some of the pressing needs as yet unmet.

At the end of the first year's study they sponsored a week's Institute for lay groups. This was conducted by Evelyn K. Davis, Assistant Director of the National Organization for Public Health Nursing. The theme of the institute was "How may members of non-professional or lay groups prepare themselves to participate intelligently and effectively in a program for the promotion of community health and welfare?" The response to this institute was gratifying, indeed.

The department of health has continued to carry on the education of this changing group of health chairmen. The health chairmen have reported on the subject discussed at each meeting to their individual clubs for the 3 years since the initiation of the plan, thus disseminating to a larger group knowledge of the organization and activities of their department of health.

Special interests have developed, some in public health nursing. Sometimes it has been the appeal of a Mothers' Day program, or the story of diphtheria prevention which has stirred the desire to take an active part.

These same women have sponsored an annual publicity campaign for Mothers' Day and have fostered the organization of classes for expectant

mothers in several of the health centers of this city.

The summer round-up chairmen of the Parent Teachers' Association have had a similar series of demonstrations, resulting in an intensive successful house-to-house canvass for diphtheria prevention, in conjunction with their own canvass for school entrants.

Negro groups are as alert to serve their race as are the white people.

The organization of an advisory committee from *below upward* is sounder than from *above downward*, according to Dr. H. S. Mustard, in his report of the Commonwealth Fund Demonstration in Rutherford County, Tenn. He says "It is wrong to assume that a leader is necessarily interested in the health program." He advocates the organization of local committees along specific lines. These committees may be kept reasonably busy supplying volunteer service. The busier they are the more they assume responsibility.

The public health nursing field is technical and at first glance it may seem that only highly trained professional workers could carry on the program, but there are many places for the non-nurse. It is an ancient calling, this service to people, and not a new profession. Weighing and measuring children is work most women love. Transporting patients to clinic, making garments for new-born babes, taking records for the doctor in clinics, making dressings and supplies, or entertaining youngsters while their mothers attend classes at health centers, are all activities in which volunteers may engage and find joy in doing.

Do all those who signify a willingness to serve maintain their interest and continue to grow with the organization? Not unless there is careful selection of volunteers and a definite plan for their instruction and the development of leadership. Let us analyze the motives underlying an interest in

public health or in public health nursing. It may be just a hobby; the person may be an "uplifter" or a "lady bountiful"; or may find in this activity an outlet for a pent-up spirit; or may have genuine interest in social progress and social welfare. If it is a genuine interest in social progress and welfare, much effort will be saved in the sifting process.

The Junior League has carefully planned a placement service for volunteers, fitting the worker into the job which is most challenging to that individual. It is advocated, too, that definite instruction with demonstrations should precede the initiation of the volunteer into any activity. We provide for growth and refresher courses for our professional staffs, and often let the interest and service of the volunteer lag because of lack of cultivation.

The liabilities and problems of volunteer service, such as irregularity and lack of continuity of service, should diminish with careful selection, placement, training and supervision. The advantages of volunteer service, such as more interest and better understanding of the work of the organization, the saving of nurses' time, the economic value in actual service rendered, the publicity value, more than offset the disadvantages.

A few municipal public health nursing bureaus have reached the point of organization of an advisory committee of lay people which assumes some responsibility for a continuing and growing community nursing service. St. Louis, Mo., and Syracuse, N. Y., each reports lay committees on nursing service whose function is the interpreting of the service to the community. Some other cities, such as Nashville,

Tenn., Charlotte, N. C., and Savannah, Ga., have joined the forces of all agencies, public and private, doing public health nursing and are affiliated under the official health department. The policies of the organization are determined by a board made up of representatives from the several contributing and interested agencies. Such a coöperative arrangement should have certain distinct advantages. Bertha O. Yenicek, Superintendent of the Municipal Visiting Nurses of St. Louis, comments on the advantages of a lay advisory committee thus:

Its advice and counsel are just as necessary for the development of the program, policies, and standards of the official agency as in the private agency—indeed more so, because of the complexities of city governmental administration. A lay advisory committee may be quite important also in securing an adequate appropriation from the city's committee on finance for the public health agency.

We conclude then that our aims in using laymen in our public health nursing programs are these:

1. To secure intelligent public response.
2. To secure and utilize volunteer effort.
3. To organize advisory committees who will aid in guiding public opinion and in advocating appropriation of public funds with intelligence and vigor, and who will aid in setting and maintaining the highest standards of personnel and of work.

What are our results thus far? We have builded through the years a stronger partnership between the professional and non-professional groups. We are directed toward organization of specific groups of lay citizens dedicated to the fostering of the purposes of the public health nursing bureaus of our official agencies with a consequent strengthening of all public health nursing in our communities.

DISCUSSION *

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I WAS especially interested in Dr. Dowling's statement relative to the attitude of the present-day official agency which is engaged in public health nursing. He said: "With the development of an earnestness of purpose and a real desire to render public health nursing service of quality, we now want to be understood; we know that an understanding public means protection of the thing we have builded."

I think Dr. Dowling is quite right and I believe that any department which has a thoroughly efficient service, or is rendering the best possible service for the expenditure which is available, *wants* the public to know what it is doing. One is always suspicious of a department or an individual who is "afraid of interference" from an advisory committee, or too close contact with a nonofficial organization. One usually finds that the department, or the individual who is afraid of interference has not been carrying out the principles which make for quality nursing, and he or she does not want to be found out, or, to use Dr. Dowling's expression, "to be understood."

Dr. Dowling mentioned that the non-official nursing agencies were the ones who originally set the high standards for public health nursing work, and I think we will all agree with him. However, recent studies indicate that the quality of work which is being done by official public health nursing agencies today compares very favorably with that of the nonofficial agencies, and I

wonder if the closer relationship between official and lay groups which is quite evident in various sections of the country, is not one factor in securing that improvement? Official health directors are realizing that they are likely to lose much of the fine organization which they have built up unless there is an informed and intelligent group of citizens ready and willing to promote the interests of their departments.

I liked Dr. Dowling's statement in regard to the three steps which are desirable in promoting the organization of lay groups. I believe that these three steps are quite essential to successful lay participation in the health program. I wonder if the apparent failure, or perhaps I should say, the doubtful value, of some volunteer programs is not due to the fact that we are expecting service from folks who have had little opportunity to know what we are trying to do, and we have made little effort to help them to become acquainted with our work. Then too, from the other standpoint, sometimes we find an enthusiastic citizen who wants to "help on some health committee," and yet when the health department calls on her for service she begins to make excuses, or, worse yet, she fails to do what she has promised to do. In other words, there are lay helpers who want to take the last step first and they are not willing to take the first two.

I am primarily interested in the rural field and I have been trying to picture how the rural health department can provide for these three steps in the utilization of lay workers. As Mrs. Trawick has stated many rural communities have very few, if any com-

* This discussion applies to the paper by Mrs. Arch Trawick in July Journal as well as to Dr. Dowling's paper.

munity organizations through which the health department can work. It is often necessary for the health department to help to promote organization before it can obtain concerted action from the community. One of the county nurses whom I have had the privilege to observe during the past year has made excellent use of lay groups and yet she found practically no organizations present when she began her work in that county. She began by organizing Mothers' Clubs in the various communities, and while the lessons were largely concerned with infant and maternal care, the facilities for general home and community sanitation were always discussed. Following the formal class periods, the nurse continued to use the club members as her committee members and she called on them for volunteer service very frequently.

For instance, a midwife came to the office one morning to report that she had just delivered a young mother whose husband had deserted her, and that the mother was alone, had no food in the house, no clothing for the baby, and no one to take care of her. No doubt every public health nurse who worked in a county which had little or no organized welfare work, met similar situations very frequently last year, but I doubt if many of them handled the situation more effectively than this nurse. She had her day's work planned so she left a little earlier than usual and stopped by to see the patient and to verify the midwife's story. Then she went directly to the leader of the Mothers' Club in that community and presented the facts to her. She said:

I'll be busy until evening, but I will call in to see Mrs. Blank when I come home tonight and when I get there, I want to find her well cared for. Here is a card which you may take to the county poormaster, and he will give you a grocery order for her; and

I am sure I can rely on you women to do the rest.

When she returned to the patient that evening, this is what she found. Six women had been in and cleaned the house thoroughly. One of the men in the neighborhood had gone to town on his mule and had got the grocery order from the poormaster, and the women had left a supply of food all cooked and ready for the mother and her other two children. The women had brought one of their "Club Layettes" for the new baby, and he was clean and asleep in an improvised baby bed. And, by the way, those layettes which were prepared by the clubs were too clever for words! The majority of the club members were very poor and while the preparation of the layettes was more or less a social activity for the group, the purchase of materials was another matter. The layettes were made entirely from used sugar and flour sacks. The sacks were first washed and usually bleached, but sometimes the original Gold Medal or Pillsbury's Best sign was still very much in evidence. All of the garments were cut according to the Maternity Center patterns though, and very neatly made, and you would be surprised to see what nice soft little garments can be made from sugar sacks.

In addition to the above service, the nurse found that the women had made out a schedule and one of them had agreed to come each day to give the mother the necessary care. Through their classes, they had been taught how to care for a mother and her baby; they knew how to recognize abnormal symptoms, and they knew how to get in touch with the nurse if anything appeared to need attention. Thus it was not necessary for the nurse to return to this home for a week and in the meantime she could be reasonably sure that the woman and her baby were getting the necessary care and attention.

That nurse has taken the first two steps in the organization of health committees. She first taught them something about their own and their community's health needs and what to do about them, then she gave them ample opportunity to practise what they had learned through volunteer service. Incidentally, when the county officials decided to do away with the health department a few months later, as an economy measure, these women and many others, made such a protest that the idea was soon abandoned and the health department was retained, in spite of the depression.

Mrs. Trawick mentioned the conflicts and unnecessary expenditures which sometimes occur because national boards or agencies, in promoting non-official health work in local communities insist upon independent action from their groups. We have all experienced some of those difficulties at times. One point I wish to make is that the official agency sometimes forgets that any agency which depends upon popular public support has to be able to point to certain definite projects as its own. On the other hand, any lay organization or nonofficial health agency which embarks upon a health program before trying to harmonize its plans with those of the existing official health agency is violating the most fundamental principles of good organization. A functioning advisory health council, made up of representatives of all local agencies and individuals who are interested in health promotion, will usu-

ally solve the problem. But the council must be "non-sectarian." It must be a county health council, not a tuberculosis, a Red Cross or a child welfare council, although each of those organizations should be well represented.

Mrs. Trawick also mentioned that it was difficult for her to differentiate between the services which her organizations rendered to the public health nursing service and those rendered to other public health services. I quite agree with her and I would like to ask—Do we want to differentiate? I would like to emphasize that the nurses are not the only workers in a health department who are benefitted by lay advice and service. In a county health department such as Mrs. Trawick has described, I favor an advisory health council which serves the entire health department. The same persons who are interested in the nursing service are interested in clean milk, safe water, the prevention of diphtheria, and hospital facilities for tuberculosis patients. After all, all of these are public health nursing problems too. Just as an intelligent lay advisory service has improved the quality of the nursing service, so it can influence and stimulate a better quality of medical and sanitation service.

The health officer, the sanitary officer, and the nurse should all participate in the county health council meetings, from time to time. The members of the council should be equally familiar with the work of each.

Qualifications and Training of Local Health Officers^{*}

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IT has been more than 150 years since Johann Peter Frank, in his work on Medical Polity, first presented the idea of "scientific medical police"; and the first suggestion that university degrees be conferred in "state medicine" was made nearly 70 years ago by Henry Wildbore Rumsey. Yet there are still many states in which there are no legal requirements that a local health officer have qualifications other than those of a general practitioner of medicine. In some states not even this is required. It is obvious that for the modern practice of public health, involving the application of knowledge from many and varying sciences, special training is necessary. "An incompetent physician endangers the health of the patient whom he attends; the incompetent health officer endangers the health of his entire community."

Students of the problem agree that local health officers need special qualifications in addition to those required for the general practice of medicine. This need has been discussed repeatedly in the Association and committees have studied it for long years. The essential facts are clear, but we need action—legal action—which will require that every person holding a responsible administrative public health position shall possess certain minimum qualifications

specified in law or in state health regulations.

As early as 1907 Biggs proposed definite requirements for the eligibility of physicians as health officials. Sir William Osler in one of his last public addresses said, "The health officer should have special training in sanitary sciences, and special courses leading to diplomas in public health should be given in the medical schools. Were the health of the people made a question of public and not of party policy, only a skilled expert could possibly be appointed as a public officer, not, as is now too often the case, the man with political pull."

New York State has been working along these lines for 20 years and has made some progress. When the Public Health Council was established in 1913, it was given authority to prescribe qualifications for local health officers and certain other public health personnel. The following year standards were established for local health officers. The State Department of Health, coöperating with a number of medical schools, offered extension courses and short residence courses in public health. Because of the great variation in the size of municipalities, ranging from the small rural towns to the large cities, any one set of standards would be too high for the one, or too low for the other.

In succeeding years laws were added

^{*} Read at a Special Session of the American Public Health Association at the Sixty-second Annual Meeting in Indianapolis, Ind., October 10, 1933.

which gave the Public Health Council authority to prescribe qualifications for directors of divisions in the State Department of Health, district state health officers, public health nurses, bacteriologists-in-charge of laboratories, and, more recently, pathologists. These requirements have been implemented by other provisions of law which require:

1. That approval shall not be issued to a laboratory unless the director possesses the qualifications established by the Public Health Council.

2. That county health commissioners shall devote their full time to the duties of their office and shall possess such qualifications for office as shall have been approved by the Public Health Council.

3. That health officers appointed after 1931 in cities of more than 50,000 population shall devote their full time to the duties of their office.

4. That "notwithstanding the provisions of any general or local law or charter a physician who is qualified by the Public Health Council shall be eligible for appointment as health officer.

This last provision invalidates any restrictive provisions of city charters and other laws concerning qualifications such as residence, length of practice in the municipality, or otherwise. The enforcement of qualifications is aided also by the authority of the State Department of Health to grant or withhold state aid. State aid to county departments of health and other local health activities, may be withheld if the standards of service, including the qualifications of the health personnel, do not meet the prescribed standards. Further control is given by state authority to remove from office an unqualified health officer.

In 1930 this whole subject was reviewed by the New York State Health Commission and further enactments were recommended to require varying standards for local health officers, depending upon the responsibility of their position and the area served. Local health officers in New York State may

be grouped, broadly, into two classes: (1) the full-time health officer, serving cities of more than 50,000 population, the full-time county commissioners of health and the district state health officers; (2) local health officers of smaller jurisdictions.

A further recommendation of the State Health Commission that all counties be required to establish county departments of health, with full-time personnel, has not yet been enacted, and we have only 5 such departments in our 57 counties. The remaining counties are served by a state supervisory staff of 14 district state health officers, state district nurses, sanitary engineers and milk sanitarians, and by local health officers in our towns and villages.

Excluding county units and cities over 50,000 population, there are 1,201 local health districts. By the appointment of one health officer to serve more than one town, village, or consolidated district, these 1,201 districts are served by about 800 health officers. A minimum of \$.15 per capita is paid to these health officers, up to \$1,200 per annum. In addition, fees for special services frequently increase this income considerably.

One-fourth of these local health districts have a population of less than 1,000; one-third have populations between 1,000 and 2,000; another one-third have populations between 2,000 and 8,000; and only 8 per cent have populations between 8,000 and 50,000. Eighty-two per cent of these local jurisdictions have populations less than 4,000 and pay a minimum salary of less than \$600 a year. These men are practising physicians and frequently the health officer is the only physician in the town or small village. The requirement of special qualifications for this group obviously cannot be so stringent as for the full-time position.

After intensive study, conference with local health officers, medical educators

and others, the Public Health Council in May, 1932, completely revised its qualifications for local health officers. Two classes were established, the first to include district state health officers and health officers of counties and of cities of more than 50,000 population, and the second to include smaller municipalities. A requirement for every health officer is that "he shall be licensed or eligible for examination for license to practise medicine in New York State."

The requirements are:

Regulation 5. Qualifications, Grade I. The qualifications for health officers in Grade I shall be practical experience and/or special training and education in public health, consisting of:

(a) Not less than 4 years of full-time experience in a responsible public health position. Or,

(b) Not less than 2 years of full-time experience in a responsible public health position and the completion of a course in public health approved by the public health council of at least 1 scholastic year in residence. Or,

(c) A combination of part-time or full-time experience in public health with special training which combination in the opinion of the council is the equivalent of either of the above qualifications.

Regulation 6. Qualifications, Grade II. The qualifications for health officers in Grade II shall be practical experience and/or special training and education in public health, consisting of:

(a) Four years' part-time experience and prior to June 1, 1932, the completion of a course in public health approved by the public health council.

(b) The completion of a course in public health, of less than 1 scholastic year in residence, approved by the public health council as qualifying for this grade subsequent to June 1, 1932.

(c) The completion of an undergraduate course in public health approved by the public health council as qualifying for this grade.

(d) Other practical experience and/or special training and education in public health work which in the opinion of the council is the equivalent of any of the above qualifications:

Provided, that under special circumstances specified in writing by the local board of health or other appointing power or by the

proposed health officer, the public health council may waive the requirements for a health officer in Grade II as to any proposed appointment, *such waiver to be valid only for the term of the proposed appointment.*

Additional regulations provide that any physician, or any local appointing officer, may submit to the Council the qualifications of a physician for opinion as to whether or not they meet prescribed standards; that such person may be required to take "such written, oral or practical examinations in public health as the Council may direct"; and that the Council may maintain lists of persons who have submitted satisfactory evidence that they possess the qualifications for either of the two grades.

Under Regulation 5(b), courses in public health at Johns Hopkins and Harvard have been approved. It should be noted that for Grade I a minimum of 2 years' experience is required in addition to an approved public health course.

For Grade II two separate types of courses will qualify. First, a "short course" of less than 1 scholastic year. This course is being given by the State Department of Health in coöperation with the Albany Medical School under the direction of one of us who is also in charge of teaching public health to undergraduates. This extension course is designed to qualify physicians now in practice and is an elaboration of previous but less extensive courses conducted in former years by the state in coöperation with various medical schools. In order to meet the needs of the health officer in the smaller municipalities, who receives a comparatively small income from his health work, a course was devised so that the major part could be accomplished in his office at times available from his practice. The extension course is divided into three parts:

(a) *Assigned readings from texts*—These

TABLE I

LOCAL HEALTH OFFICERS
NEW YORK STATE

(Excluding health officers of cities of 50,000 or more and of the 5 counties with county health departments)

Number of local health districts		1,201
Number with health officer	1,188	
Number of vacancies	13	
Number of health officers serving 1,188 districts		786
Grade II or not qualified	786	
	<i>Number</i>	<i>Per Cent</i>
Health officers, not including Grade I:		
Not qualified	146	19
Qualified—	568	72
by undergraduate course	39	
by extension course	404	
(52% of 786)		
by special experience	61	
by long and satisfactory service	64	
Serving under waiver, pending completion of extension course	72	9
	786	100

include the Public Health Law, Sanitary Code, and State Department of Health publications. There are 20 assignments during the year. After reading the assignment the student refers to a "test of study" and writes answers to questions. Students last year reported an average of 6 hours required to do each of the reading assignments and prepare the "test of study."

(b) *A Conference of 1 day each month with the district state health officer*—At each of these monthly conferences a separate phase of local health work is discussed and the student is coached in the practical application of health requirements and the conduct of health activities. One-half of each conference day is spent in observing and participating in such health activities as: inspection of pasteurizing plants; attendance at clinics for tuberculosis, venereal disease, child hygiene, and mental hygiene; administration of Schick and Mantoux tests; visits to approved laboratories, to sewage disposal and water filtration plants.

(c) *One week in residence at Albany*—This is required after completion of the 20 written assignments and 8 monthly conferences. This residence week is for purposes of review, lectures and demonstrations by a temporary faculty of experts in various public health

and clinical branches and for an examination when necessary to test the candidates' fitness.

About 40 students were graduated last year and approximately 100 will take the course this year.

Realizing that instruction in public health should be given more fully in undergraduate medical courses, the provision (Reg. 6-c) permits qualification for Grade II by an approved undergraduate course in public health. Before standards were established for these courses, conferences were held with deans and professors of preventive medicine in each of the medical schools of the state. A committee from this group of medical educators itself drew up for approval by the Council the minimum requirements which must be met in order to entitle a course to approval.

This has resulted in the stimulation of public health teaching to all undergraduates and, obviously, has resulted

in the advancement of preventive medicine well beyond the immediate advantage of qualifying young physicians for positions as local health officers in our smaller health districts.

The results of our efforts to require minimum qualifications for health officers are summarized in Table I. It will be noted that more than 80 per cent of them will have met prescribed qualifications by the end of this scholastic year. The remainder, to a large extent, are serving under waivers chiefly because no qualified physician is available in the small jurisdictions.

Of interest in the training of other public health personnel, but not appropriate to the present title, are the programs of the State Department of Health for the training of public health nurses, operators of water purification and sewage treatment plants, operators of milk pasteurizing plants, bacteriologists, and other health personnel.

In summary, I may say that our practice has developed along very simple lines. We recognize the need

for a physician to have special training in order to be a satisfactory health officer. Adequate laws have been enacted which require special training. For our full-time positions high standards have been set. Our local health structure admittedly is unsatisfactory in its multiplicity of small units and part-time service. The nature and extent of the training possible naturally is limited by the character of the positions. We have fostered courses and assisted in the conduct of courses designed to provide necessary training. In addition, the courses have been of benefit in giving to a large group of practising physicians a broader concept and a better understanding of public health and preventive medicine. Other states, with more satisfactory local units of government, should be able more readily to enforce high standards. The American Public Health Association can and should take the lead in advancing public health in this country through improving the qualifications of local health officers.

A Measles Year

THERE have been reported to the U.S. Public Health Service by state health officers from January 1 to June 9, 1934, 602,990 cases of measles. By periods of 4 weeks, these have been distributed as follows:

These figures include reports from all states except Nevada. Reports of measles are always incomplete, as it is too often regarded as a mild disease and many cases are not reported.

<i>4 weeks ended</i>	<i>Cases</i>
Jan. 27, 1934	51,498
Feb. 24, 1934	94,984
Mar. 24, 1934	128,505
Apr. 21, 1934	132,389
May 19, 1934	124,923
June 9 (3 weeks)	70,691
Total (23 weeks)	602,990

It is evident from the figures that the epidemic is now subsiding.

EDITORIAL SECTION

Expressions of opinion and statements of supposed facts are published on authority of the writer under whose name they appear, and are not to be regarded as expressing the views of the American Public Health Association, unless such statements or opinions have been adopted by vote of the Association.

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PUBLIC HEALTH IN THE FAR WEST

THERE may have been a time when some members of the American Public Health Association would have agreed with Daniel Webster when, as Secretary of State in 1843, he intimated to Dr. Marcus Whitman, of Oregon Trail fame, that the Rocky Mountains formed a natural barrier to the westward progress of civilization. Nevertheless, some degree of public health civilization did reach the West. Whether through spontaneous generation or a series of bitter experiences, or a combination of both, western public health organizations, both official and voluntary, have grown apace.

The West has always had its public health problems, some of them unique. Famine and illness threatened the followers of Brigham Young during their first winter in Utah (1847). Cholera took nearly one-fourth of the population of Sacramento in 1850 and 1851. A peculiar fatal illness resembling typhus, but occurring only on one side of the tributaries of Idaho's Snake River, was known as early as 1873, and first described by Maxey of Boise in 1889.¹ Subsequently, Montana's Bitter Root Valley became the stage for one of the most dramatic episodes in public health, resulting in partial solution of the Rocky Mountain spotted fever problem.

Migratory tuberculosis first became a problem in Colorado and California in the 1850's, and it continues a serious problem in the western and southwestern states today. It is recorded that in 1871 the tuberculosis death rate in one section of California reached 344 per 100,000 population.² The highest tuberculosis death rates known in the United States today are in Arizona, 345.7,³ New Mexico, 302.5,⁴ Colorado, 165.7,⁵ California, 132.6.⁶ In none of these states has the rate of reduction of tuberculosis deaths been equal to that of the registration area since 1900.⁷

Coccidioidal granuloma, now of increasing public health importance, and apparently endemic in western arid sections, was first described by Rixford in San

Francisco in 1893.⁸ Dr. Beatty of Utah, Dean of western state health officers, states that he first saw cases of serious illness following bites by the deer-fly in the late 90's, and repeatedly called it to the attention of the Public Health Service, with the ultimate result that tularemia was identified. Plague was first officially recognized in this country in San Francisco in 1902. Three outbreaks have been recorded in California since then, the last in Los Angeles in 1924. It is endemic among California ground-squirrels, and a circumscribed, fatal epidemic among these squirrels has just occurred in the sparsely populated, eastern portion of Kern County.

Earthquake, fire, and flood, with their accompanying public health aspects, have been frequently known in this section. Shellfish sanitation, sewage disposal, and the sanitation of large irrigated areas have presented difficulties peculiar to the West. Following the pioneers, after preliminary discomforts had been overcome, came the horde of health seekers, easy prey for the cults, an ever-present problem in western public health administration. Cultism and smallpox are inseparable companions on the playgrounds of the West.

Until comparatively recent years, full-time health officers and adequately financed health departments have been few and far between in the West. It is not surprising, therefore, that western public health took some time to develop an *esprit de corps*, and yet developed it vigorously when it did appear. Considering their starting point, it would probably be hard to find any large section of the country which has developed a public health consciousness more rapidly than the West in recent years. In many respects, today's western public health picture is one of the most favorable of any in the nation.

For instance, the State of California has provided a state subsidy for local tuberculosis sanatoria since 1915. At present, 90 per cent of the population of this state has access to tax supported, locally administered tuberculosis sanatoria. Last year's Christmas Seal Sale in California, despite the 4th year of the depression, brought 3.3 cents per capita, and was exceeded only by Pennsylvania and New York.⁹ Outstanding contributions in fundamental research concerning tuberculosis now come each year from Arizona, Colorado, California, and Oregon.

In the past 30 years, the West has contributed important fundamental data to our knowledge of vaccinia, alastrim, botulism, coccidioidal granuloma, plague, spotted fever, mottled enamel, shellfish sanitation, and psittacosis.

Important advances in mental hygiene and the teaching of psychiatry to medical students have been contributed from the University of Colorado Medical School. Excellent public health research is coming from the Hooper Foundation for Medical Research, the laboratories of the California State Department of Public Health, the U. S. Public Health Service laboratories at Hamilton, Mont.; Seattle; San Francisco; and Pasadena, also from the medical schools at the Universities of California, Southern California, Colorado, Oregon, and Stanford. Good courses in public health are being given to undergraduates in the medical schools of the Universities of Colorado, California, Southern California, Oregon, Stanford, and Loma Linda. Splendid courses for public health nurses are offered in the University of California, University of Oregon, and University of Washington.

Los Angeles County is reputed to have one of the best organized health units in the United States. It is to be credited with having retained and supported the same health officer for nearly 20 years. The San Francisco City and County Health Department is one of the country's outstanding examples of successfully combining the public health function with that of hospital administration. For

over 20 years, this department has operated the school health program in the San Francisco public schools. Western cities have entered the U. S. Chamber of Commerce Health Contest in surprising numbers and have made excellent showings.

Since 1928, when the Western Branch of the American Public Health Association was organized, the Western membership of the Association has increased from 125 to nearly 500. In addition, they list well over 1,000 so-called Regional Members who are not necessarily full-time public health workers. It is in recognition of these gratifying public health advances in the West and of the success of the Western Branch that the Association this year in holding its 63rd Annual Meeting joins the Western Branch in observing its 5th Annual Meeting in Pasadena, September 3 to 6, inclusive.

The Western Branch, as well as all public health workers of the Pacific Coast, joins in a most cordial invitation to our parent Association and the public health workers of the middle states and the East. We know that we can learn much from them and we hope that owing to differences of climate, endemic diseases, immigration, etc., they will find something of interest in our western country.

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POLIOMYELITIS IN CALIFORNIA

WE have been aware for some time that poliomyelitis was unusually prevalent in California, especially in the County and City of Los Angeles. From January to May inclusive, 130 cases have occurred in Los Angeles County and 205 in the City. Orange County comes next with 18 cases, while San Francisco, the largest city in the state, has only had 11. Altogether, there have been 432 cases as follows: January, 25; February, 26; March, 18; April, 36; and May, 327—a total of 432. The jump in May has been something tremendous.

It is needless to add that the situation has caused alarm in other parts and cities of the state, and health officers everywhere are watching the situation and taking every precaution to prevent the spread of the disease.

Nearly 82 per cent of the cases have occurred between the ages 1 and 14, inclusive, the greatest incidence falling between 5 and 9. After the age 14 there is a rapid diminution in the incidence, and those above 35 are practically immune, judging from the figures.

Unfortunately, poliomyelitis still has many secrets which earnest workers all over the world are endeavoring to penetrate, so far without entire success.

While one attack produces lifelong immunity as a rule, the production of artificial immunity is far from having reached a satisfactory and practical state.

In the New York epidemic of 1931, more than 400 control cases were compared with 500 cases who received a serum believed to contain virus-neutralizing substances. The results showed no advantage in favor of the serum treated cases. A similar result was obtained in 1932 by Kramer and Aycock on a smaller number of cases. The serum of those who have recovered from the disease contains a virus-neutralizing substance, and this is true for the majority of adults in urban populations. Prevention has been attempted by the injection of 10-20 c.c. of convalescent serum or parental whole blood, with apparently good results. However, the same report shows that of 2,200 persons not treated, only 31 developed the disease. On the authority of Park, it may be stated that no safe and reliable method of active immunization in man has been found. Different methods have been successful in monkeys, but none has proved sufficiently safe and effective to warrant its application to man.

A SAD MILESTONE IN SANITARY ENGINEERING PROGRESS

IN almost every era of real progress in civilization a few individuals are born who carry on the major activities which distinguish that era. Such an individual, during the advance of sanitary engineering practice in the past 50 years, was George W. Fuller. His death on June 15, 1934, in New York City, at the age of 65, marks the passing of one who had probably more to do with the technical development and the public stimulation in the installation of municipal sanitary devices than almost any man in this country.

Of ancient English ancestry, he was born at Franklin, Mass., a state which has given to this country a long line of distinguished sanitarians. By heredity and by training he was equipped to perform a timely task in the sanitary field.

Educated at the Massachusetts Institute of Technology, he supplemented his training at the University of Berlin and in the private office of Piefke, engineer of the Berlin Water Works. For 5 years thereafter, he had the advantage of contact with some of the most distinguished sanitary leaders in this country at the Massachusetts State Board of Health and at the Lawrence Experiment station.

Beginning in 1895, he conducted the important water filtration experiments at Louisville and later at Cincinnati. The results of these studies established many of the basic principles adopted in the treatment of water supply from that day to this. During the World War he was a member of a sanitary committee at Washington regulating the engineering planning and sanitation of the various Army



George W. Fuller

camp in this country. As consulting engineer to the U. S. Public Health Service and to the Construction Division of the Army, he was responsible for a considerable part of the practices which resulted in the unprecedented low typhoid fever death rate in the Army camps.

He was professionally and intimately engaged for many years in developing programs for sewerage and water supply systems for the Sanitary District of Chicago, New York City, and over 150 large cities in this country and abroad. He was almost as well known in England, Germany, France, and the Far East as in this country.

In American Public Health Association affairs, he was one of the initiators of and contributed largely to the development and widespread adoption of the Standard Methods of Analyses for Water and Sewage, sponsored by the A.P.H.A. He was probably more responsible than any other individual for the successful publication of the *Manual of Water Works Practice* by the American Water Works Association. The list of society activities with which he was identified is so long that it can hardly be repeated here. He was distinguished, however, for the fact that his interests were not only administrative during his entire lifetime, but that he was closely identified with and always highly stimulated by the desire to develop new technical processes and improvements in existing practice. In the American Public Health Association he had a long career of active participation. In 1914 he was Vice-Chairman of the Sanitary Engineering Section; in 1915, its Chairman; in 1924 an elective councillor; in 1925 and 1926, a member of the Executive Board; in 1927 to 1929, a member of the Governing Council; in 1927 to 1928, Vice-President; 1928 to 1929, President, and in 1933 an Elective Councillor for 2 years.

He was past Vice-President and Director of the American Society of Civil Engineers, Past President of the American Water Works Association, and a member of most of the important technical societies in this country and abroad. At the time of his death he was Chairman of the Engineering Foundation, a research organization of the national engineering societies.

In the midst of his busy existence he produced many valuable articles and three books: *Water Purification at Louisville*, *Sewage Disposal*, and *Solving Sewage Problems*, each of them milestones in the development of sanitary engineering practice in this country.

His loss to the public health profession in enthusiasm, in professional judgment, and in technical wisdom is irremediable.

PUBLIC HEALTH EDUCATION*

IF YOU ARE SO FORTUNATE

as to live west of the Mississippi, and particularly if you live in a mountain or coast state, we hope that you will agree that an unusual opportunity is offered in holding the annual meeting of the A.P.H.A. in Pasadena.

IF YOU ARE HEALTH OFFICER OR ASSOCIATION EXECUTIVE

we hope that you will make every effort to facilitate the presence at Pasadena of any and every member of your staff who has anything to do with planning, preparing, writing, distributing health education material.

IF YOU DO ANYTHING IN HEALTH EDUCATION

planning or preparing material, or doing clerical or mechanical jobs, we hope that train, bus or flivver will bring you to Pasadena.

Wrong Again!—"I note with fiendish glee," writes Dr. W. W. Bauer, "two errors in a single paragraph" in this department under "Education and Reference" in the June, 1934, issue, page 655.

To begin with, I note a most startling title assigned to one of Thurman Rice's sex education pamphlets, to wit. "High Life Goes On and On, For Girls of High School Age." Perhaps it does, but not in the Rice pamphlets. Will you please undo this aspersion on the younger generation? The correct title is "How Life Goes On and On."

Will you also kindly correct the statement that individual pamphlets, priced at 25 cents each, cost \$2.00 per set. The correct price per set is \$1.00.

Of course we know that Dr. Bauer is director of Bureau of Health and Public Instruction, American Medical Association, 535 N. Dearborn St., Chicago, Ill.

School Health Education Institute—Elsewhere appears a detailed announcement of the Health Education Institute to be held at Pasadena, this

year to be devoted to school health education.

We Salute Colombia!—We are delighted to receive a copy of *Salud Y Sanidad*, a publication of Departamento Nacional De Higiene Para La Vulgarizacion Y Propaganda De La Higiene Publica Y Privada, at Bogota. Two cover pages with illustrations in color, and a number of sketches with a touch of humor to make them appealing. We hope that Director Ricardo Bonilla will send copies of his health education material to Pasadena.

Who Will Get the Most at Pasadena?—They will get the most ideas for home use, and the best hunches to try out in their own work who go to Pasadena prepared to squeeze the most from the opportunity.

How about making a list of what you would like to learn?

Could you officially canvass the entire staff for questions to be answered and information to be sought?

Hold a staff meeting to discuss the most important questions on which your

* Please address questions, samples of printed matter, criticism of anything which appears herein, etc., to Evart G. Routzahn, 130 East 22d St., New York, N. Y.

department or association wants light?

If, as we hope, several staff members will go to Pasadena could you allocate the questions, placing responsibility for getting what is wanted?

Could you decide in advance upon some of the specialists and other individuals who could be consulted?

Could you select certain meetings in which your questions could be asked in the discussion period?

And, of course, it is to be hoped that you will check over your experiences and your successes, or failures, to decide on what you will tell to those you meet and what you will bring up in certain appropriate sessions of the convention.

All of the above applies as well to all phases of public health and of public health activities.

"Things to Forget"—In "a debunking of some of the good old traditions—based on scientific fact," Dr. W. E. Forsythe says:

Hygiene has been spoken of as the yellow dog in the curriculum pack. There is more truth in the statement than in many ideas which have been promoted as hygiene. Too much of the traditional subject matter of hygiene has rested upon unscientific data. Many personal opinions, half truths, and uncontrolled observations have failed to survive immersions in scientific criticism. Such scrutiny promises well for the future of hygiene, which subject is probably not alone in needing "debunking."

Oracular emanations seem never to be recalled. High sources of dogmatism occasionally should reverse the current, retract former deliveries, admit error, and tell us which of former teachings to forget. Certainly much that has been taught as valid hygiene is now recognized as unhygienic, useless, or of doubtful value, and should be forgotten. There are so many worth-while things to be learned about health that no time should be wasted on that which present-day science does not support.

Followed by debunked samples in *Journal*, National Education Assn., June, 1934, Washington, D. C., and

Journal of Health and Physical Education, March, 1934.

Colloquial Health Teaching—Effective health teaching is done in Jamaica through local types speaking in vernacular. In "A New Way to Treat An Old Disease," we are told of an observation visit to the Kingston Dispensary by Aunt Eliza Bush-Tea. Dead "set against the doctors and their scientific methods" in the diagnosis and treatment of tuberculosis, Aunt Eliza protested that

"Dem doan' know to use Nature's remedies. The Lawd mek 'erbs grow far every ailment He set on mankin. Wat de sense of dese injections and 'ospitals and dem tings. Ef 'im meant fa mans to hab dose t'ings why 'E doan' say so in de Good Book?"

"But Aunt Eliza," Retinella had replied, "why can't we make progress in medicine as well as other things? Look at the development of motor cars and airplanes; you old people didn't dream of them when you were young. Many of the modern inventions have been applied to medical problems, helping the advance of treatment immensely."

The common sense argument won Aunt Eliza whose visit is reported in detail in *Jamaica Public Health*, Kingston, June, 1934.

Bring One Hundred Address Cards—We think you will have use at Pasadena for nearly if not all of a hundred address cards or 3 by 5 inch slips on which have been typewritten your name and full address. (It is surprising how many address cards do not carry the name of the city.)

You will hasten acquaintanceship and facilitate the exchange of ideas and information by offering your card.

And you will use quite a number of the cards at the luncheon discussion-demonstration session of education and publicity helps.

And you will use quite a number of the cards when you examine the displays at "Education and Publicity" headquarters and wish to receive free

copies of many items which will be shown there.

"We Tell the Truth"—A "Public Health Column" has been started for the newspapers of the state by the New Mexico Bureau of Public Health. In a recent issue Dr. Earp said:

It is our intention in this column always to tell the truth. We make mistakes no doubt. Whenever we discover them or they are pointed out to us we shall attempt to correct them. But we do not intend to suppress the truth, because we do not believe that it is in the public interest to do so. Health departments have before now kept quiet about poor health conditions in the fancied interest of a trade with tourists or other visitors. The people suffer and in the long run even the tourist trade suffers from such a policy. Nothing encourages visitors to a health resort so much as to know that there is a health department on the job on whom they can rely for a truthful report.

Many Methods and Many Needs—Opportunities for reaching the people are considerably more varied and more numerous in the smaller cities than in the larger ones, in proportion to the population.

The possibilities for the use of diverse methods and materials are much greater in the smaller than in the larger cities.

The resources which can be found and may be used largely increase as the population decreases from that of the greater to the lesser cities.

Much of this sort of material will be brought up in the discussion-demonstration luncheon of the Public Health Education Section at Pasadena. (Be sure to have plenty of address cards for use at this luncheon meeting.)

Easier Steps Are the Best First Steps—An obvious strategy for cancer education is suggested in *Bulletin* of American Society for the Control of Cancer, 1250 6th Ave., New York, N. Y., June, 1934. Under "Accessibility and Cancer Education":

Among the various types of cancer there exist very different degrees of accessibility. This fact has an extremely important bearing on the success of any educational campaign concerning their detection and treatment.

Inasmuch as cancer of the skin occurs more frequently on exposed areas such as the face or hands it is obviously a relatively easy type to detect in its early stages. It is also easy to reach for any selected type of treatment. We may therefore expect that as educational work progresses the death rate from skin cancer may be materially lowered.

To some degree these arguments apply also to cancer of the mouth, tongue, or lip. In the two former types, however, the patient himself must be held responsible for reporting suspicious symptoms as soon as they are recognized.

Nodules which may be early cancer of the breast can be easily detected by any woman who is intelligent and enlightened enough to adopt the habit of periodically examining her own breast tissue. The word "enlightened" in this instance has a very important connotation. It refers to the unfortunate prudishness which makes some women loath to take an intelligent and impersonal interest in the well-being of their own bodies. This factor is of far more importance among those born before the twentieth or late nineteenth century than it is in those who belong to the younger generation. The latter, thanks to increasing sanity and frankness in dealing with questions of human physiology, are not subject to stupid taboo as are their elders.

This fact is perhaps the greatest single cause for optimism concerning the eventual control of uterine cancer. Only those who understand the difference between normal and abnormal manifestations of uterine activity can be expected to recognize and report the latter for immediate examination and diagnosis. Granted, however, that women in increasing numbers adopt a modern and healthy attitude toward the hygiene of the reproductive organs, the chances of improving the situation as regards mortality from uterine cancer is good.

Much remains to be done for handling other forms of cancer among all classes.

In the meantime, public education had probably better place its major emphasis on cancer which occurs in more accessible locations. In the case of cancer of the skin, lip, tongue, and mouth, the educational material and methods can be simple and direct. In dealing with cancer of the breast and uterus, the influence of the intimate site of the cancer must be considered.

If and when progress in the control of different types has been made we shall have powerful and convincing arguments with which to create public support for the more costly and difficult campaign against internal manifestations of this disease.

Please Do Us a Favor—The editor of this department of the *Journal* solicits the privilege of personally meeting every member of the Public Health Education Section who will be at Pasadena, and every health worker who is concerned with or interested in health education.

Please double the favor by mentioning your name and your connection, if possible presenting a copy of your address card.

We thank you in advance.

What They Want to Know—An editorial in *Hygeia*, May, 1934, on "Health Questions and Answers" discusses the 4,500 letters addressed to *Hygeia* asking questions about health.

Most letters asked more than one question, the average being about 136 questions for each one hundred letters. One letter out of every ten asked, either exclusively or in addition to other questions, about books dealing with health subjects. Questions about books, in fact, led the list of subjects. This was true also in 1932. Next in order of interest, occurring in the proportion of one letter out of every fifteen, were questions about food and diet, while questions about the hair and the scalp came next; these were found in one letter out of eighteen. These two subjects virtually shared second place in 1932, occurring then in one letter out of fifteen.

Other subjects in order of interest related to the bones and joints, mainly arthritis and rheumatism; "beauty" questions; sex, not including birth control or diseases of the reproductive organs; drugs; allergy or sensitization, of interest to hay fever and other sufferers; physical therapy; diseases peculiar to women; and on up to a total of 25 subjects.

Most interesting is the shift in order of interest as detailed in this 2-page edi-

torial. In 1932 drugs occupied 25th place; maternal and infant death was in 7th place, dropping to 18th place in 1933; and so on. Our guess is that the range of subjects treated in *Hygeia* and the nature of the articles had some influence on the changed ranking in the classification of the replies.

Hygeia's correspondence covers the entire United States from coast to coast. The letters originate in homes of all characters; they come from writers with a liberal education as well as from those with almost none. A good general education does not seem to carry with it any guarantee of wisdom in health matters.

The letters prove that America is health-conscious, but they prove also that much remains to be accomplished before America can be said to be intelligently health-conscious. The emphasis on personal appearance, evidenced by the prevalence of questions about hair, scalp and "beauty," as compared to the apparent apathy toward real health problems, which is shown by the infrequency of questions on the more important topics, proves that health instruction on the more important topics, proves that health instruction is a big and important job.

Health Education in the Journal
—To facilitate future reference to mentions of health education we plan to record here what has been published on the subject in previous issues of the *Journal*.

In the June, 1934, issue see two references to education in the editorial on "The Medical Examination of Food Handlers."

The same issue includes:

"Organization of Adult Groups for Health Education," by Mary P. Connolly.

"A Plan to Increase Understanding of Scientific Medicine," by T. J. Edmonds.

Your Headquarters at Pasadena—Please make full use of "Education and Publicity" headquarters in the Municipal Auditorium at Pasadena.

Meet your friends there.

Come there as often as possible to examine the display.

Bring there your questions and your problems.

Be there to share your ideas and experiences with others.

Leave your address cards for mailing to your home addresses numerous useful samples and valuable helps. (*Be sure to learn just how this is done.*)

Have plenty of address cards to hand to those you meet so that they will get clearly who you are and what you do, and may note on the card what they promise to send to you.

EDUCATION AND INFORMATION

"The Care of the Child from One to Six," a selected list of references. *Child Health Bulletin*, 50 W. 50th St., New York, N. Y. May, 1934.

"The Control and Treatment of Cardiac Cases Occurring in School Children," by Dr. W. P. Brown, State Education Dept., Albany, N. Y. 2-page reprint. *Free*.

"Depression Makes Health Inroads" is a letter-size handbill issued by Los Angeles Community Chest.

"The Doctor's Office as a Health Center" is the April, 1934, issue of *Tuberculosis Abstracts*, available through any tuberculosis association. Describes the coöperative plan in Detroit.

"Doctor, What Toothpaste and Mouth Wash Do You Recommend?" leads up to the suggestion of common salt, or precipitated chalk and castile soap. *Health Bulletin*, North Carolina State Board of Health, Raleigh. May, 1934.

"Enjoy Health and Happiness at Dayton's Recreational Centers This Summer" is a large, folded broadside issued by Dayton, Ohio, Council of Social Agencies. Inside is a "treasure map" with a key to locate summer opportunities.

"Health: Diseases, Drugs and Sanitation." Superintendent of Documents, Washington, D. C. *Free*. A classified list of federal government publications.

"Health," Ontario's annual health almanac for 1934, drops all calendar features, continuing the varied miscellany of personal and community health material. "The contents are designed to meet the many inquiries from people throughout the Province." Illustrated; 104 pages. The 1934 edition ran to 80,000 copies. Ontario Dept. of Health, Toronto, Ont.

"Present Guides for Household Buying," a handbook of sources of information which should be useful to hospitals, sanatoria, etc., in making the most of the budget. Ask Department of Agriculture, Washington, D. C., for a copy.

"School Lunches," with recipes to serve 50 children. Bureau of Home Economics, Washington, D. C., 13 pages. *Free*.

The Bureau of Nutrition and Health Education, University of Texas, Austin, offers

. . . a set of 8 colorful posters known as the Every Day Health Series, prepared for use in illustrating lessons on health habits. Each poster has an atmosphere of happiness and action.

"Every Day," at the top is followed by such statements as "Play out of doors," "I drink milk," "I brush my teeth," together with a silhouetted picture.

They are 12 inches high, 17 inches long. Set for 45 cents; 55 cents outside of Texas.

The following have been issued by State Dept. of Health, Albany, N. Y.:

"Every Child Needs Cod Liver Oil." 1 page.

"Milk: A Gilt Edge Investment." 4 pages.

"Constipation." 4 pages.

"The Public Health Nurse and the Work She Does." 11 pages.

"The Division of Laboratories and Research." History and present status; 81 pages; many illustrations; 6 large folded floor plans.

"Protection Against Diphtheria." 4 pages. Factual statements in every day language.

Four reprints from *Hygeia*, American Medical Assn., 535 N. Dearborn St., Chicago, Ill.:

"Cancer: Its Status Today." 8 pages. 10 cents.

"A Child Is To Be Born." 45 pages. 15 cents.

"Feminine Beautification." How—from Cleopatra to Greta Garbo. 11 large pages. 10 cents.

"The Child Who Stutters," by F. B. Brown. 22 pages. Bibliography. 10 cents.

"An Index of Nutritional Status," "Vitamin D Milk," and "The Flavor of Milk" make up recent issues of *National Dairy Council Digest*, Chicago, Ill. Free.

Three summer bulletin board posters are offered by Employer's Mutuals, Wausau, Wis.: on poison ivy, prone resuscitation, and first aid for sunstroke or heat prostration. Free.

"Your Child and the School," by Dr. A. G. Ireland, director of physical and health education, New Jersey State Dept. of Public Instruction. Health News Service, 22 E. 40th St., New York, N. Y. Brief 175-word statements for newspaper use on "Summer visiting," "Summer mishaps," etc. Free.

IDEAS AND INFORMATION

About lettering for posters or displays, says *Michigan Public Health*, Lansing (April, 1934):

Letters should never be so unusual or fantastic as to divert the attention of the reader from the thought itself. Tilted devices or ornamental letters often obstruct the thought. Originality is to be commended and is fine if not carried too far. As a general rule, letters should have height and width but not thickness. Giving a third dimension to a letter calls attention to the letter itself and hinders the thought from being clearly given. There is flexibility about all letters and we can vary them by making them heavy or light, large or small but never distorted.

More size does not increase the legibility or the drawing power of a letter. A small letter well placed and not crowded will attract more attention and can be seen farther than a large letter crowded into a small space.

A short story contest has been announced by *Journal of the Outdoor*

Life, 50 W. 50th St., New York, N. Y. The Christmas Seal must enter the story, but need not dominate it. Details in the May, 1934, issue.

"Classes for Prospective Fathers," by E. V. Thiehoff, M.D. *Public Health Nursing*, 50 W. 50th St., New York, N. Y. Dec., 1933. "Something new for Cleveland in prenatal instruction."

Again *Syracuse Herald*, Syracuse, N. Y., has issued a tabloid magazine section devoted to "Our Babies," with numerous articles, signed and unsigned.

The Child Health Day tabloid supplement of *Honolulu Star-Bulletin* was matched by *Nippu Jiji*, a Japanese paper. Of the latter supplement says James G. Stone, Tuberculosis Assn. of Hawaii:

This is the first health supplement ever issued by a foreign language paper in Hawaii, and I am wondering whether it is the first foreign language child health supplement issued in the United States. At any rate, we will claim that it is until somebody disproves our contention.

An effective example of a brief for a special proposition has been prepared by the Committee on 8 Hours for Nurses, 132 East 45th St., New York, N. Y. A light green cover, with contents; 6 mimeographed pages of text; an off-set page reproducing "A Few Recent Headlines Reflecting Public Interest." A folder enclosure, and a leaflet of suggestions for workers are both well-written and attractively printed. Send 10 cents for samples.

MAGAZINE ARTICLES

Offered as source material; some deserve commendatory letters to editors.

"A Reporter at Large: The Surgeon," by Morris Markey. *New Yorker*, 25 W. 45th St., New York, N. Y. Feb. 3, 1934. 15 cents. Visit to a hospital operating room; convincing tribute to the care, skill and attitude of surgeons and nurses; an example of

high grade reporting; should be useful where there is unfounded criticism of a hospital.

"Back to the Midwife?" by H. H. Smith. *New Republic*, 421 W. 21st St., New York, N. Y. July 4, 1934. 15 cents. Questions as to the place of the midwife.

"Milk: Its Story from Farm to Town," by H. Ripperger. *New York Times Magazine*. June 10, 1934.

"My Daughter and I," by O. Rutter. *Rotarian*, Chicago, Ill. April, 1934. "A dad who wants his girl to grow up with eyes wide open."

"Mysteries and Medicals," by O. Ferguson. *New Republic*, 421 W. 21st St., New York, N. Y. July 4, 1934. 15 cents. Brief review of recent Hollywood output built around physicians.

"Paying for Health," by C. P. Streeter. *Farmer's Wife*, St. Paul, Minn. Sample free. How a Michigan county found that it could not afford to do without a county health unit.

"The Potato Defies the Dietician," by H. Ripperger. *New York Times Magazine*. May 13, 1934.

"Social Work in Hospitals," by H. M. Bartlett. *Junior League Magazine*, 305 Park Ave., New York, N. Y. June, 1934. 30 cents.

PUBLIC HEALTH BULLETINS

"Bulletins" or "house organs" issued by many health agencies represent a surprising range of interest or lack of interest in the readers.

Now may well be the time for all good editors to review the past year's out-put, seeking to determine what changes might be introduced next fall.

The following with an additional

paragraph is the Fourth of July message of the Middletown, N. Y., *Bulletin*:

When the fireworks begin to shoot, remember this story. General Leonard Wood recovered from a severe gunshot wound inflicted when a mortar shell burst inside a gun, exploding it. But his small grandson died from tetanus resulting from a wound produced by a toy pistol. It isn't the size of the firearm or of the injury which tells the story.

In "Facts and Health" Dr. Dowling gives 3 pages to an effective presentation of the values of a local health survey. *Birmingham's Health*, Jefferson Co. Board of Health. June, 1934.

"A Philosopher Looks at Health," quoting from Thomas Carlyle, is an example of usable material to be gleaned from the library. In *Weekly Bulletin*, California Department of Health, Sacramento. March 17, 1934.

Two pages of quotations from newspaper editorials appear in *State Board of Health Bulletin*, Madison, Wis. The editors say some of the things the State Board likes to tell its readers.

"What Is Your Answer?" is a page of questions in *Understanding the Child*, Massachusetts Society for Mental Hygiene, 3 Joy St., Boston, Mass. 15 cents. Numbers indicate pages where the answer may be found to confirm the reader's answers.

Michigan Out-of-Doors is now *Health*, issued monthly by Michigan Tuberculosis Assn., Lansing.

Monthly Bulletin, Indiana Division of Public Health, Indianapolis, has been revived under the editorship of Dr. Thurman B. Rice.

Bulletins are issued now by the Greater Vancouver Health League and the Provincial Sanatorium at Charlottetown.

BOOKS AND REPORTS

Japanese Medicine, Vol. XII of "*Clio Medica*" Series—By Y. Fujikawa, M.D. Translated from the German by John Ruhrah, M.D. New York: Hoeber, 1934. 114 pp. Price, \$1.50.

This belongs to the series of handbooks published under the general title "*Clio Medica*," edited by E. B. Krumbhaar, M.D.

The author divides the subject according to the ten political periods, beginning with the mythical period, which includes all Japanese history prior to 96 B.C., and ending with the present reign of the Meiji family who came on the Imperial throne in 1868. The book is another revelation of the fact that the Japanese are not originators but borrowers of great adaptability.

Medicine was probably first introduced into Japan from Korea which had long practised Chinese medicine. Deeply impressed, the Japanese sent students to study Chinese medicine at its source. For the first 1500 years of the present era Japanese practitioners depended largely upon the Chinese for their methods and inspiration. In the 6th century Buddhism was introduced into Japan from Korea and China and rapidly came into national favor. This tremendously stimulated Japanese interest in the Chinese medicine of that day because the Buddhist missionary priests from the mainland were generally physicians as well. In time Buddhist priests in Japan came to have an influence in their own country comparable to that of the Christian monks in Europe in the Middle Ages. In their treatment of disease they naturally laid more stress on prayer than on medicine. "When great epidemics appeared it was customary to appease the plague demons with prayers and incan-

tations. But smallpox patients were driven out of their homes and treated in isolation houses."

In a chronological table, the author frequently refers to national epidemics of various kinds. In 1512 A.D., he speaks of an epidemic skin eruption which came either from China or the Loochoo Islands, and which the author considers was the introduction of syphilis into Japan. He also refers to several febrile epidemics in the 18th century which he implies were influenza.

European medicine was introduced into Japan in 1556 by a Jesuit medical missionary from Portugal. For the next 300 years Western medicine was successively banned and reintroduced. Sometimes all was banned except surgery which was always accepted as superior to internal medicine from Europe. Following the Portuguese came Dutch, and soon after German physicians. As Western medicine came in the influence of Chinese medicine steadily waned, but again and again the latter would recrudescence, as Western medicine was for periods ostracized together with its handmaiden, Christianity.

Immediately after the opening of Japanese ports to foreign trade, following Admiral Perry's display of the American fleet in the port of Yedo in 1854, and the subsequent civil war which brought in the rule of the Meiji family in 1868, Western medicine, along with Western arts of war, was officially recognized. The government sent commissioners to Europe and America to study everything. One result was that the German language was officially adopted as the medium of instruction for most higher learning, including medicine. Japanese students were sent

to Germany, and many German physicians and scientists were brought to Japan to teach medicine and the premedical sciences.

The reviewer, who frequently visited Japan from 1910 to 1927, would hardly agree with the author of the last chapter, that the "Government has placed medical education on an equal footing with that of other countries." It is true that Japan has emerged from antiquated medicine and has adopted scientific medicine of the West in a remarkably short space of time, but her best medical schools and hospitals are not yet comparable to our best. The encouraging phase is that steady progress is being made and that her scientific men are more and more making important contributions.

The author states that Japan has 27 medical schools, of which 15 are classified as imperial in rank, more than 1,000 hospitals and over 50,000 physicians. Some 50 medical journals are published, the majority in the Japanese language, but several in German. This use of the German language rather than English has obviously tended "to make the English-speaking world overlook many meritorious works done in Japan."

HARVEY J. HOWARD

The Biology of Bacteria: An Introduction to General Microbiology—By Arthur T. Henrici, M.D. *New York: D. C. Heath and Company, 1934.* 482 pp. Price, \$3.60.

This book is the outcome of the successful teaching of various phases of bacteriology by the author over a number of years. It is a most interesting and accurate presentation of the subject in which various ramifications of the science are indicated. Without going into detail, controversial questions are suggested to the student and the known facts concerning these questions are presented. An attempt is made to

interest the student in the history of bacteriology by using a style similar to that of de Kruif in "Microbe Hunters."

An unusually clear discussion of optics, including the use of the dark field condenser, is given in one of the earlier chapters. Apparently a slip, such as is often found in first editions, has occurred on page 33 in the use of the terms "acid side" and "basic side" of the isoelectric point. This gives rise to an incorrect statement of the nature of the charge on an amphoteric substance.

The relationship of bacteria to other organisms is considered in sections dealing with protozoa, algae, fungi, and ultramicrobes. Technical methods are given in detail as need for their use arises rather than in a special section. A chapter dealing with heredity and variations of bacteria is very opportune in view of the literature which has recently accumulated on this subject. The truly scientific aspects of bacteriology are discussed in sufficient detail for the needs of the beginning student.

Sections on molds, protozoa and virus diseases complete the book. It contains a number of well selected, and for the most part, original, illustrations. The style and make-up of the text are excellent. The volume is unusually free from errors of any sort.

This is not just another textbook on general bacteriology, but a different one. It is suitable for students in general bacteriology regardless of the field of the science in which they may expect to specialize.

NEWELL R. ZIEGLER

Jimmy Chew—By Harrison W. Ferguson, D.D.S. *Chicago: Issued by Good Teeth Council for Children, 1934.* 31 pp. Paper.

This little booklet explains, under the four headings of "Right Food," "Chewing Exercise," "Tooth Brush,"

and "Your Dentist," the fundamentals of tooth development and care. It is intended for young children and should attract their interest by its simplicity and numerous illustrations.

Good Teeth Council is the latest addition to the group of organizations with an educational purpose and a commercial background. There is in "Jimmy Chew," however, only one casual reference to chewing gum with which only the most ardent sticklers for æsthetics could find any fault.

A foreword explains that the booklet has the approval of educators, health workers, nutritionists, and the dental profession. For free copies, communicate with Good Teeth Council for Children, 400 North Michigan Boulevard, Chicago.

JOHN HALL

Health Workbook for College Freshmen—By Kathleen Wilkinson Wootten. Published by the Author, Milledgeville, Ga. (2d ed.), 1934. 214 pp. Price, \$1.50.

This text or workbook is designed as "An Orientation course in personal, home, and community hygiene."

Its introduction discusses several important factors relating to the health education program such as the qualifications of the teacher, health supervision of college students, correlation of various college departments to secure better student health, suggestions to the teacher of freshman hygiene, and the integration of freshman health and physical education courses.

Each of the 47 chapters is an outline covering the content to be noted, activities to be used in study, prevention, or correction. Each chapter is concluded with a generous bibliography on the topic concerned. More specific references, *i.e.*, giving title of chapter, would save the student much time, and make his study more gratifying and profitable.

A general bibliography following the

group of lessons, together with a list of sources, organizations, and magazines from which material may be secured, gives added value.

This text is a radical departure from the usual college textbook of hygiene, and conforms more nearly to the modern concept of college teaching.

CHARLES H. KEENE

Studies on the Possible Intoxicating Action of 3.2 Per Cent Beer—By A. J. Carlson, N. Kleitman, et al. Chicago: University of Chicago Press, 1934. Price, \$.75.

These experiments, undertaken to study the possible intoxicating effects of 3.2 per cent beer on man, were in part financed by a grant from the U. S. Brewers Association to the University of Chicago.

Three measurements were made—(1) alcohol concentration in blood and urine; (2) objective performance tests; and (3) subjective judgments of change in behavior of the subjects by observers. Sixty-three pages are given to descriptions of the experimental work, with illustrations and tables. For the average reader the Discussion and Summary will be found the most useful part of the report.

It is well known that many definitions of drunkenness have been given from its social, legal, and physiological aspects. The report of the Alcohol Investigation Committee of the British Medical Research Council on this point is quoted and discussed, also the discussion of the Committee of the Judiciary, U. S. Senate.

The writers of this report point out that a number of things may bring about in certain people some of the changes which have been attributed to alcohol, and that certain people, without taking any alcohol, commit misdemeanors, indiscretions, and crimes which others are guilty of only when under the influence of liquor. They

believe that the concentration of alcohol in the blood seems to be one of the most reliable of the objective criteria of intoxication.

The Summary gives a résumé of the 7 types of experiment carried out, in which some 113 subjects participated, beer being given to some in very moderate amounts and at well spaced intervals, while for others there was forced drinking every 30 minutes for 8 consecutive hours.

The conclusion is based on the Senate Committee's definition of an intoxicating beverage, and the writers decide that "beer containing 3.2 per cent alcohol by weight is not an intoxicating beverage."

The report is lucidly written and the auspices under which the work was done assure one of its authenticity.

MAZŮCK P. RAVENEL

Maternal Mortality and Morbidity

—By J. M. Munro Kerr, M.D., F.R.F.P.S. (Glas.), F.C.O.G. Baltimore: Wood, 1933. 382 pp. Price, \$8.25. (Made and printed in Great Britain.)

This is the most complete and exhaustive study of maternal mortality and morbidity that has come to my attention. While the material is drawn largely from England, Scotland, and Wales, the basic factors are comparable with those found in the United States. At the end of an illuminating introduction, Dr. Kerr states:

... it emerges from the inquiries which the following pages summarize that puerperal mortality and morbidity in this country can be reduced by a figure which, on a conservative computation, may be stated at not less than 40 per cent, but only if the essentials already stated are complied with.

A satisfactory maternity service for the country can be created without disturbing existing conditions to any great extent: no one engaged in obstetric practice need have his position prejudiced.

The volume is divided into 5 main

parts, the first setting forth in detail all of the causes, direct and indirect, which affect puerperal mortality. A chapter on maternal morbidity and subsequent disablement by Dr. Donald McIntyre and one on neonatal death and disablement by Prof. Geoffrey B. Fleming are especially informative.

Part II deals entirely with prevention, both in its antenatal aspects and in the suitable management of labor. These two chapters form the core of the book and are replete with practical suggestions for the prenatal care of both healthy women and women with inter-current diseases. Conservative aseptic obstetrics is urged. Radiography is recommended as a method of examinations which may be of the greatest value in diagnosis of obscure conditions during pregnancy. Six interesting radiographs are given to illustrate this section.

Part III takes up in 7 chapters the various services available, such as domiciliary service, hospitals, prenatal clinics, midwifery service, and transport service. A whole chapter is devoted to the education of medical students in obstetrics and gynecology.

In Part IV, Dr. Kerr presents his scheme of organization for a national maternity service. "This scheme presumes the establishment of a national maternity service based on the insurance principle." It is recommended that there be a Central Directing Board associated with the Ministry of Health for England and Wales and the Department of Health for Scotland. While this service is designed primarily for the artisan class, largely of insured persons, and for the poor and destitute, its provisions are so broad that it will affect the whole obstetric practice. This scheme is compared with three others which have been under consideration recently.

The whole volume will bear careful study in view of recent investigations

of a similar nature in the United States and elsewhere. The book is well presented and conveniently arranged for reference.

RICHARD A. BOLT

Modern Sewage Treatment—By T. P. Francis. London: *The Contractor's Record, Ltd.*, 1932. 322 pp. Price, \$7.50.

This is a broad but somewhat brief outline of sewage treatment developed by the author in a most attractive and instructive manner. The fundamentals in the treatment of any sewage are emphasized and the book developed around these fundamentals. I believe it is one of the best introductions to the problems of sewage treatment I have ever read and for that reason would recommend it highly for students or for sanitary engineers who are broadly interested but perhaps not actually

operating or engaged in the designing of plants.

To those who are more intimately connected with the operation or design of plants, and especially to young engineers, it would be valuable as a reference book for the fundamentals, if supplemented by other books or current literature which would go further into the details of the specific problems concerned.

An appendix of 68 pages covers outlines of: (1) Sewage chemistry, (2) Hydrogen Ion concentration, (3) Theory of colloids, (4) Application of colloidal phenomena, (5) An outline of biology.

The book has many excellent sketches, drawings and pictures, in fact, about half of the book is composed of illustrations.

ALFRED H. FLETCHER

BOOKS RECEIVED

MEDICINE: A VOYAGE OF DISCOVERY. By Joseph Lobel. New York: Farrar & Rinehart, 1934. 334 pp. Price, \$3.00.

THE SCIENCE OF WORK. By Morris S. Viteles. New York: Norton, 1934. 442 pp. Price, \$4.00.

THAT HEART OF YOURS. By S. Calvin Smith. Philadelphia: Lippincott, 1934. 212 pp. Price, \$2.00.

CHILDREN OF THE NEW DAY. By Katherine Glover and Evelyn Dewey. New York: Appleton-Century, 1934. 332 pp. Price, \$2.25.

HYGIENE AND HOME NURSING. By Louisa C. Lippitt. Yonkers: World Book Co., 1934. 424 pp. Price, \$1.24.

WORK RELIEF IN GERMANY. By Herta Kraus. New York: Russell Sage, 1934. 93 pp. Price, \$.50.

INFLUENZA. Part II. By David Thomson and Robert Thomson. London: Bailliere, Tindall & Cox, 1934. 1557 pp. Price, \$15.50.

MILITARY MEDICAL MANUAL. By the Military Surgeon. Washington: National Service Publishing Co., 1934. 774 pp. Price, \$4.50.

THE ANCESTRY OF THE LONG-LIVED. By Raymond Pearl and Ruth DeWitt Pearl. Baltimore: Johns Hopkins Press, 1934. 168 pp. Price, \$3.00.

KEEPING CAMPERS FIT. By Elena E. Williams. New York: Dutton, 1934. 227 pp. Price, \$2.50.

THE PNEUMONOKONIOSES (SILICOSIS) BIBLIOGRAPHY AND LAWS. By George G. Davis, Ella M. Salmonsens and Joseph L. Earlywine. Chicago: Industrial Medicine, 1934. 482 pp. Price, \$7.50.

DEATH RATES BY OCCUPATION. Edited by Jessamine S. Whitney. New York: National Tuberculosis Assn. 32 pp. Price, \$1.00.

LEISURE-TIME INTERESTS AND ACTIVITIES OF BUSINESS GIRLS. A Research Study. By Janet Fowler Nelson. New York: Women's Press, 1934. 113 pp. Price, \$.75.

MANUAL OF NURSERY SCHOOL PRACTICE. By Iowa Child Welfare Research Station. Iowa City: University of Iowa, 1934. 215 pp. Price, \$1.00.

THE DANGEROUS AGE IN MEN. By Chester Tilton Stone. New York: Macmillan, 1934. 105 pp. Price, \$1.75.

A SELECTED PUBLIC HEALTH BIBLIOGRAPHY WITH ANNOTATIONS

The Little Fleas That Bite 'em— Phage plays a part in modifying the sensitivity of invading organisms to the destructive action of complement in each instance of invasion in which the diseased host produces antibodies. The experiments reported complete the fifteen-year-old study of the general behavior of phage.

D'HERELLE, F., and RAKIETEN, T. L. Mutations as Governing Bacterial Characters and Serologic Reactions. *J. Infect. Dis.* 54, 3:313 (May-June), 1934.

Testing Vitamin D Milk—A method is proposed for testing the potency of milk fortified with antirachitic vitamin. The importance of clinical experience to supplement laboratory studies is emphasized in a second paper reporting upon research along the lines of the proposal.

ELIOT, M. M., *et al.* Potency of Milks Fortified with Respect to Antirachitic Properties (and) Prevention of Rickets by Milk Fortified with Vitamin D from Cod Liver Oil. *J.A.M.A.* 102, 22:1823 (June 2), 1934.

Detecting Food Impurities—Some of the problems of the British analyst of foods and drugs are recounted in an interesting dissertation given over largely to milk, but including jam, that most important part of the British dietary.

EVANS, J. Recent Advances in Food Analysis. *J. Roy. San. Inst.* 54, 12:599 (June), 1934.

Infantile Paralysis Outbreak Studied—Convalescent serum is believed by the author to have been of value in the treatment of poliomyelitis cases in a Quebec epidemic occurring in 1932. Evidence of increased resistance due to nonspecific immunity support the

earlier suggestions in regard to this phenomenon. Other findings of the study are recorded.

FOLEY, A. R. The 1932 Epidemic of Poliomyelitis in Quebec. *Canad. Pub. H. J.* 25, 6:260 (June), 1934.

Dangers to Granite Workers—Quarry drillers may be as dangerously exposed to granite dusts, and experience as high a tuberculosis death rate as do other pneumatic tool workers in cutting sheds. The dustiness in both occupations may be eliminated.

BLOOMFIELD, J. J., and DREESSEN, W. C. Silicosis Among Granite Quarriers. *Pub. Health Rep.* 49, 23:679 (June 8), 1934.

International Coöperation in Public Health—The broad subject indicated in the title is interestingly presented in a series of lectures which together should prove to be an invaluable historical document.

BUCHANAN, G. S. International Coöperation in Public Health. *Lancet*, 1, 17:879 (Apr. 28), 1934.

When to Revaccinate—Immunity conferred by a single vaccination usually lasts longer than the traditional 7 years. The protection lasts for 20 years in most individuals.

DEARING, W. P., and ROSENAU, M. J. Duration of Immunity following Vaccination against Smallpox. *J.A.M.A.* 102, 24:1993 (June 16), 1934.

Preventoriums?—Do preventoriums really prevent tuberculosis? A study of the results in 705 children cared for at a Boston preventorium shows that over a 10-year period only one child has died of tuberculosis and two cases developed. What would have happened had there been no care given, we can-

not know, but the surveyors of the project are convinced that it has been well worth while.

HAWES, J. B., *et al.* A Study of Ten Years' Work at the Prendergast Preventorium of the Boston Tuberculosis Association. *New Eng. J. Med.* 210, 25:1321 (June 21), 1934.

Cows, Not Pigs, the Offenders—Bovine type organisms of the abortus-meletensis group were responsible for the cases of undulant fever occurring in New York State. Most patients had no contact with cattle but drank raw milk.

GILBERT, R., and COLEMAN, M. B. Undulant Fever in New York State. *J. Infect. Dis.* 54, 3:305 (May-June), 1934.

When Eyes Need Help—All the information one would need about the incidence of eye refractions is available in this survey of 8,758 representative white families. Headache was the most frequent cause. A dozen other useful findings are recorded.

COLLINS, S. D. Frequency of Eye Refractions in 9,000 Families Based on Nationwide Periodic Canvasses 1928-1931. *Pub. Health Rep.* 49, 22:649 (June 1), 1934.

Social Responsibility in the New Order of Things—Can we accomplish social planning under democratic leadership or shall it be forced upon us by a dictatorship? There is no other choice but chaos. Upon this postulate the author considers nursing, and finds that the nurse promises to meet the

challenge of the new order. In some similar way to public health nursing, medical care must be provided. Health services must be expanded to meet the new concepts of social responsibility. Don't miss this dissertation.

WINSLOW, C.-E. A. The Challenge of Today. *Pub. Health Nurs.* 26, 6:283 (June), 1934.

Toxoid for Adults—Experience with medical students and nurses leads the authors to conclude that toxoid is a satisfactory immunizing agent for adults provided the described precautions are observed.

KELLER, A. E. and HARRIS, S. The Use of Diphtheria Toxoid in Immunization of Medical Students and Nurses. *J.A.M.A.* 102, 26: 2163 (June 30), 1934.

They Shall Not Die—Maternal mortality can be improved if we have the will to put preventive measures into effect. What these measures are is outlined in convincing detail.

KOSMAK, G. W. Community Responsibilities for Safeguarding Motherhood. *Pub. Health Nurs.* 26, 6:292 (June), 1934.

For Stylish Stouts—Milk and bananas are proposed as a basis for a satisfactory reducing diet, on the grounds of simplicity, low cost, ready availability, palatability, high satiety value, low salt content and demonstrated effectiveness.

HARROP, G. A. A Milk and Banana Diet for the Treatment of Obesity. *J.A.M.A.* 102, 24:2093 (June 16), 1934.

ASSOCIATION NEWS



THE HUNTINGTON LIBRARY AND ART GALLERY, PASADENA, CALIF.

THE HUNTINGTON LIBRARY AND ART GALLERY

WITHIN a period of 20 years Henry Edwards Huntington, a retired capitalist who had amassed a fortune in developing transportation systems, assembled an outstanding group of 18th century English paintings and a library of source material for the study of English and American culture that ranks with the best collections of its type in this country and in England. The panoramic view reproduced on this page gives an idea of the visitor's first impression—two stately buildings in a beautiful setting on the crest of a knoll on a 207 acre estate, which includes a 10 acre cactus garden, the Japanese garden, the rose garden, and collections of palms and cycads. The rarity of the plants draws many students of botany, including organized groups devoted to garden study and landscaping.

The deeds of trust created a self-perpetuating board of 5 trustees with the responsibility of administering the trust as a "free public research library, art gallery, museum, and botanical garden," whose object is the "advancement of learning, the arts and sciences,

and to promote public welfare." An increasing number of scholars from English and American universities make use of the Huntington Library for its unique and rare material.

In the new wing of the Art Gallery one may see such famous masterpieces as *The Blue Boy* of Gainsborough, the portrait of Mrs. Siddons, the great English actress, *The Tragic Muse*, by Reynolds, and little Miss Sarah Moulton-Barrett, "*Pinkie*," by Lawrence.

Through the courtesy of the Huntington Library a special exhibit on Public Health in Tudor England will be shown to visitors at the Annual Meeting in Pasadena. This is scheduled for Tuesday afternoon, September 4. Rarely do public health workers have the opportunity to see on display the proclamations which were the origin of the development of our public health principles. The following article written by Sanford V. Larkey, M.D., will refer to some of the many items of interest which those engaged in public health work will find at the Huntington Library.

PUBLIC HEALTH IN TUDOR ENGLAND

SANFORD V. LARKEY, M.D.

*Assistant Professor of Medical History, University of California
Huntington Library International Research Fellow*

TO THOSE interested in the history of public health measures, 16th century England is particularly important, for during this century and in the early part of the 17th century, there developed those ideas of the state's direct concern with the health of its citizens which are the basis of our modern public health organization.

For an appreciation of the problem as it presented itself to the medical men of those days it is necessary to have some understanding of the knowledge of the time. It is the purpose of the exhibition of books and manuscripts at the Huntington Library to give this background, to indicate the part played by the government, and the origin of certain public health measures. In addition to the exhibition, "Medical Knowledge in Tudor England," there will also be shown various books and documents illustrating the actual practice of public health administration in Elizabeth's reign, and the extension of this in the time of James I. Included in this material will be proclamations—for control of the epidemics of plague, for improving housing conditions, pure food regulations, bills of mortality, hospital rules, and the official London Pharmacopoeia.

Naturally, the practice of medicine and the measures to combat disease were based on the theories then prevalent. These traditional beliefs are illustrated by a number of works on the subject, and from these one can get a good idea of what the Elizabethan doctor thought and how he practised his art. Great emphasis was put on the preventive

aspects of medicine. Thomas Cogan, writing in 1584, says:

The art of Phisicke . . . hath two principall partes: the one declaring the order howe health may be preserved, the other setting foorth the meanes how sicknes may be remedied. Of these two partes (in mine opinion) that is more excellent which preserveth health and preventeth sicknes.

The best doctors of the time appreciated their duty to the public. True followers of Hippocrates, they had high ethical standards and deplored the activities of quacks and charlatans. There were many pleas for licensing requirements and for stricter laws. In 1518, on the advice of Thomas Linacre, the College of Physicians was founded, to control medical practice in London. It is significant that from this year also date some of the most important public health measures, initiated by the Privy Council, as the isolation and marking of infected houses, the isolation of goods from infected houses, the first London plague orders, and the first mention of bills of mortality.

This very important factor in controlling disease, the publication of bills of mortality, listing the numbers dead in each parish of the city, and the diseases of which they died, was inaugurated in England, and an example of one of these very rare documents will be exhibited.

The plague orders were expanded into a book for the use of the entire country, about 1588. In this, Elizabeth enunciated the policy of the participation of the state in matters of health.

This was consistent with her general attitude, that the welfare of all the people was the concern of the state, and that the state existed for the people. Thus, it could interfere with individual liberty, if the good of all the people were at stake. There were the usual protests that such rules infringed on personal rights. Some people insisted, on religious grounds, that the plague was not infectious, and that one should not attempt to avoid it, as this showed a lack of faith in God. This attitude often interfered with certain sections of the "Orders" concerning assemblies of people in time of plague. The idea that the plague was caused by the wrath of God frightened the people in the more serious epidemics, and there was a section in the "Orders" forbidding ecclesiastical or lay persons "to utter such dangerous opinions upon the payne of imprisonment." A number of preachers were thrown into jail for continuing to spread such doctrines.

In these "Orders" and in similar works, the procedure for dealing with an epidemic was outlined. Important factors in this were the isolation of the infected, rules against assemblies of people, closing of schools, cleaning of the streets, provision for food supply, burial of the dead, and the treatment of the sick. It had been suggested that the city hire physicians and surgeons to care for those with plague, and in the "Directions," set down by the College

of Physicians in 1636, this scheme was adopted. These men were paid a stipend by the city "to apply themselves to the cure of the Infected." If they died in service their widows were given a pension for life.

The organization thus outlined undoubtedly did much to check the spread of the plague but, since the real cause of the disease and the means of transmission were not known, it was impossible to eradicate it. There were some devastating epidemics. In 1603 and in 1625 the death rate in each instance was over one-sixth of the total population. At these times the people became panic-stricken and the system broke down. The rules could not be enforced, the dead were left unburied, and everyone looked out for himself as best he could. Many of the doctors gave up in despair and fled from the cities but some courageously stayed and cared for the afflicted. Those hired by the city were bound by oath to remain. This human factor is one of the most difficult elements in administering any general scheme, as we realize today.

But the method of public health supervision described in the manuscripts and rare printed tracts in the Huntington Library exhibition was fundamentally sound and is the basis of our modern system, which now, with increased scientific knowledge of disease, has almost freed the world from such epidemics.

RAILROAD TRAVEL TO PASADENA

THE attention of the membership is again called to the fact that no identification certificates or special credentials are necessary this year to secure reduced railroad rates to Pasadena. Summer excursion fares are effective from most points, or short-term special rates. Consult your local ticket agent

concerning your transportation if you are not traveling on the A.P.H.A. Special Train. The Association will make all arrangements for the group on the Special.

See page 670 of the June *Journal* for 45-day, round trip summer tourist fares from various centers.

THE PASADENA ANNUAL MEETING

GENERAL INFORMATION

PREVIOUS issues of the *Journal* have carried information to which members may wish to refer if they are making plans now to attend the Pasadena sessions. The following may be helpful:

June, pages 668 and 669. Pasadena hotels, with rates. Reservation blank

June, page 670. Forty-five day round trip, summer tourist rates from principal points.

July, pages 778 to 806. Scientific program, Health Education Institute program, meetings of other organizations, places of general and scientific interest in Pasadena and in California.

A.P.H.A. SPECIAL TRAIN AND ALL-EXPENSE TOUR

A MOST representative group of Association members, their families, and their friends have reserved accommodations or signified their intention of doing so on the Special Train to Pasadena which the Association is sponsoring. The all-expense, conducted tour includes an evening in Chicago at the World's Fair, attendance at the Indian Ceremonials at Gallup, N. M., a day at the Grand Canyon, a day and an evening in San Francisco, a day in Stockton, Lodi and Sacramento, several hours in Salt Lake City and Denver, with entertainment and sightseeing at each stop. Detailed information about the tour was sent to the membership in June and will be repeated on request.

If you ride the A.P.H.A. Special, you will find in the delegation many of your old friends, and you will make many

new ones. If you cannot make the complete tour, join it for such portion of it as you find convenient.

You must let us know in advance, if we are to have the pleasure of your company for all or for any part of the journey. We are sorry, but it will not be possible for you to join the Special Train en route unless arrangements with this office have been concluded before the departure of the train from New York on Tuesday, August 28.

SPECIAL SESSION ON POLIOMYELITIS
SINCE the July *Journal*, containing the preliminary program, went to press, the Health Officers Section has arranged a symposium on poliomyelitis, announced here for the first time. The program follows:

SYMPOSIUM ON POLIOMYELITIS

- Previous History of Poliomyelitis in California. J. D. DUNSHEE, M.D., and IDA MAY STEVENS.
- Administrative Problems. J. L. POMEROY, M.D., and GEORGE H. ROTH, M.D.
- Clinical Features This Year. A. G. BOWER, GEORGE M. STEVENS, M.D., R. W. MEALS, MARY BIGLER, JOHN EWING, and VERNON HAUSER.
- Poliomyelitis in Northern California. KARL F. MEYER, M.D.
- Pathology. ROY VAN WART, CYRIL COURVILLE, and E. M. HALL.
- Experimental Investigations. LESLIE WEBSTER, JAMES TRASK, and JOHN PAUL.
- Epidemiology. JAMES P. LEAKE, M.D., HOWARD CHOPE, E. O. CEDAR, W. PALMER DEARING, M.D., and A. G. GILLIAM.
- Serum in Prophylaxis and Treatment Including Hospital Outbreak. JOHN F. KESSELL, PH.D.
- Orthopedic Phases. JAMES V. LUCK.
- Discussion opened by: GEORGE PARRISH, M.D., and C. L. LOWMAN.

APPLICANTS FOR FELLOWSHIP

HEALTH OFFICERS

Cecil M. Burchfiel, M.D., San Jose, Calif.
 Erval R. Coffey, M.D., Seattle, Wash.
 Frank G. Crandall, M.D., Santa Monica, Calif.
 Peter J. Cuneo, LL.B., M.D., Bakersfield, Calif.
 Roy M. Fortier, M.D., Salinas, Calif.
 Lunsford D. Fricks, M.D., D.P.H., Seattle, Wash.
 Ralph Hendricks, M.D., Spokane, Wash.
 Walter A. Leonard, M.D., Cambridge, N. Y.
 Louis Olsen, A.B., Palo Alto, Calif.

LABORATORY

Marcos Fernan-Nunez, M.D., Milwaukee, Wis.
 V. G. Isvekov, M.D., Rusk, Tex.
 W. LeRoy Mallmann, Ph.D., East Lansing, Mich.
 Austin U. Simpson, M.D., Seattle, Wash.

VITAL STATISTICS

Ethel R. Hawley, Montgomery, Ala.
 Mary H. Lemon, Honolulu, Hawaii
 Pierre-Paul-Henri Parrot, M.D., C.P.H.,
 Bergerville, Que., Canada
 John H. Watkins, Ph.D., New Haven, Conn.

PUBLIC HEALTH ENGINEERING

Rene Cyr, B.A., Montreal, Que., Canada
 Louva G. Lenert, B.S. in C.E., Jacksonville, Fla.
 Judson L. Robertson, Jr., B.S. in C.E., Washington, D. C.
 Harvey G. Rogers, Minneapolis, Minn.
 Francis J. Sette, Ph.B., S.M., Richmond, Va.
 W. Waldo Towne, C.E., Pierre, S. Dak.
 P. J. Alwin Zeller, B.S., College Station, Tex.

INDUSTRIAL HYGIENE

J. Lewis Amster, M.D., New York, N. Y.
 Elston L. Belknap, M.D., Milwaukee, Wis.
 John J. Bloomfield, B.S. in C.E., Washington, D. C.
 Dean K. Brundage, B.A., Washington, D. C.
 Willard J. Denno, M.D., Dr.P.H., New York, N. Y.
 Robert A. Kehoe, B.Sc., Cincinnati, O.
 Michael Lake, M.D., New York, N. Y.
 May R. Mayers, M.D., New York, N. Y.
 William J. McConnell, M.D., New York, N. Y.
 Eleanor Rantoul, New York, N. Y.
 Austin D. Reiley, New York, N. Y.
 Bradford C. Scudder, M.D., Cleveland, O.
 William R. Tilton, M.D., Newark, N. J.
 Lee J. Zoeller, Cincinnati, O.

FOOD AND NUTRITION

Arthur H. Bryan, V.M.D., M.A., Baltimore, Md.

CHILD HYGIENE

Charles L. Outland, M.D., Richmond, Va.

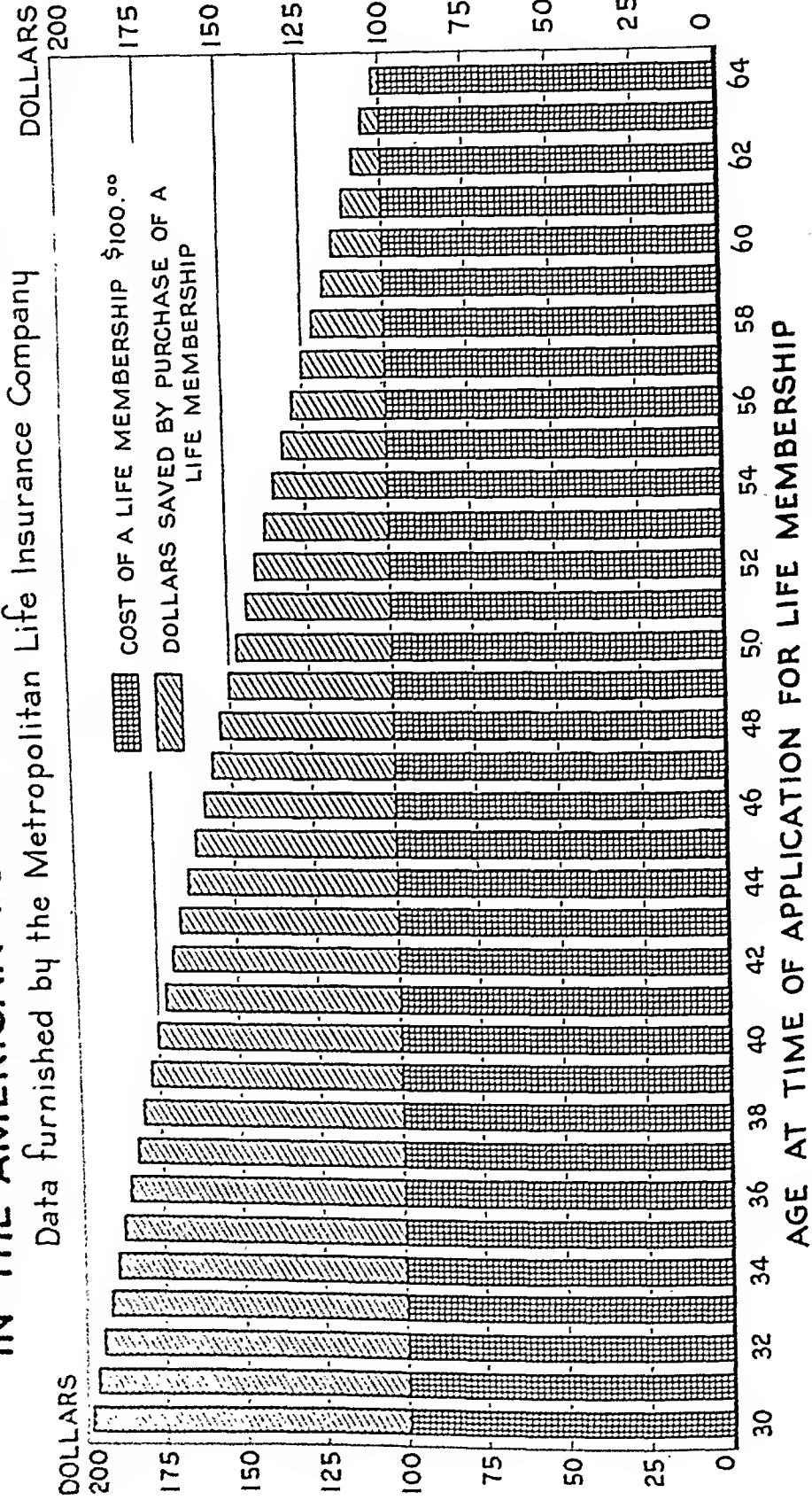
PUBLIC HEALTH EDUCATION

Neil S. Dungay, M.D., Ph.D., Northfield, Minn.
 Marjorie L. Foster, B.S., Boston, Mass.
 William J. French, M.D., Elliott City, Md.
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 Jean V. Latimer, A.M., Boston, Mass.
 Helen I. D. McGillicuddy, M.D., Boston, Mass.
 Robert W. Osborn, A.B., Buffalo, N. Y.
 Aurelia B. Potts, M.S., R.N., Nashville, Tenn.
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 Laura A. Draper, B.S., New York, N. Y.
 Nina E. Garrison, B.S., Nashville, Tenn.
 Bertha C. Greenwell, R.N., Nashville, Tenn.
 Elinor D. Gregg, Washington, D. C.
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 Frances F. Hagar, B.S., Murfreesboro, Tenn.
 Edna L. Hamilton, R.N., Detroit, Mich.
 Adah L. Hershey, R.N., Des Moines, Ia.
 Ruth W. Hubbard, B.S., Philadelphia, Pa.
 Erna Kowalke, R.N., Milwaukee, Wis.
 Anna H. McCarthy, R.N., Fargo, N. D.
 Bettie W. McDonold, Louisville, Ky.
 Edna L. Moore, Toronto, Ont., Canada
 Olga Oberhellmann, R.N., University City, Mo.
 Mabel J. Rue, M.A., Grand Rapids, Mich.
 Emilie G. Sargent, R.N., Detroit, Mich.
 Kathryn K. Schulken, R.N., Denver, Colo.
 Mary E. Stebbins, R.N., St. Louis, Mo.
 Minnie A. Thomas, R.N., Oklahoma City, Okla.
 Louise K. Tooker, Cincinnati, O.

DOLLARS SAVED BY THE PURCHASE OF A LIFE MEMBERSHIP
[In place of payment of annual dues]
IN THE AMERICAN PUBLIC HEALTH ASSOCIATION



APPLICANTS FOR FELLOWSHIP (cont.)

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 Elsie Witcher, R.N., Pittsburgh, Pa.
 Marion C. Woodbury, R.N., Great Barrington, Mass.
 Juanita G. Woods, R.N., Richmond, Va.

EPIDEMIOLOGY

Samuel M. Creswell, M.D., Tacoma, Wash.
 Anson B. Ingels, M.D., Globe, Ariz.
 James P. Leake, M.D., Washington, D. C.
 Edwin L. McQuade, M.D., Dr.P.H., University, Va.

Vivian A. Van Volkenburgh, M.D., Dr.P.H., Baltimore, Md.

UNAFFILIATED

Lela J. Beebe, M.D., Santa Maria, Calif.
 Helene T. Bennett, A.M., Yuma, Ariz.
 W. Alfred Buice, M.D., Dr.P.H., Pullman, Wash.
 Helen L. Burke, Denver, Colo.
 Hazel Corbin, New York, N. Y.
 Ernest C. Dickson, M.B., M.D., San Francisco, Calif.
 Raphael B. Durfee, M.D., Bisbee, Ariz.

A WORD TO THE THRIFTY

VERY few of us, at any time, will entirely disregard an opportunity to reap a financial benefit from thrifty buying or from careful and calculated investments. Why, then, do A.P.H.A. Fellows continue to overlook the gain inherent in Life Membership? They should do so no longer.

A careful study of the chart on the opposite page will reveal the savings which will accrue to Fellows by taking Life Membership at various ages. For example, a Fellow applying for Life Membership at the age of 40 will save a little over \$75. This saving (three-quarters of the cost of Life Membership) is of such proportion as to warrant careful investigation.

Beside the straight economical benefits, others accrue to Life Members: (1) annual payment of bills is onerous to some—Life Membership eliminates that; (2) in times of low income, a Life Member is assured of his continuation in the Association, thereby safeguard-

ing for all time his professional standing; (3) a Life Member can pride himself on the high type of professional spirit he has shown by investing in the future of public health work.

Life Membership dues need not be paid at once—the payments may be spread over a year from the date of election, which takes place at each Annual Meeting.

Some may ask—What is done with the dues of Life Members? They are set up in a Life Membership Fund entirely separate from other Association funds, and only the interest therefrom is used to carry the cost of each Life Member's participation in Association activities.

It must be obvious that the advantages of Life Membership far outweigh the disadvantages. The Committee on Fellowship and Membership, therefore, urges each and every Fellow to give serious thought to the desirability of applying for Life Membership.

NEW MEMBERS

The following list includes applicants who have been approved for membership in the A.P.H.A. by the Sub-Committee on Eligibility. These new members have requested affiliation with the sections indicated, and action by the Section Councils will follow.

Health Officers

- Edmundo Avina, M.D., Avenida Alcalde No. 134, Guadalajara, Jal., Mex. Chief of Coördinated Services (Federal and State)
 Edward J. Farrell, M.D., 3206 Oak Park Ave., Berwyn, Ill., Health Director, City Health Dept.
 H. F. Hutchinson, M.D., Pearl St., Forestville, N. Y., Health Officer
 Robert D. Hyde, M.D., 9615 Brighton Way, Beverly Hills, Calif., Acting Health Officer, District of Los Angeles County
 W. Lassiter, M.D., Gainesville, Fla., City Health Officer
 Charles Nelson Leach, M.D., C.P.H., Volksgesundheitsamt, Hanuschgasse 3, Vienne I, Austria, Field Director, International Health Division, Rockefeller Foundation (Assoc.)
 Gustavo A. Rovirosa, M.D., Unidad Sanitaria Cooperativa, Orizaba, Vera Cruz, Mex., Director of Coöperative Health Unit of Orizaba

Laboratory

- George Dexter Brigham, Ph.D., State Board of Health, Montgomery, Ala., Charge of Laboratory
 Clara Winifred Burnham, A.B., 2451 Hearst Ave., Berkeley, Calif. (Assoc.)
 Julia M. Coffey, A.B., 373 State St., Albany, N. Y., Assistant Bacteriologist, Division of Laboratories and Research, State Department of Health
 Roy Edward Coupal, P. O. Box 606, Eureka, Calif., City Bacteriologist
 Jesse H. Inman, M.D., Kern General Hospital, Bakersfield, Calif., Director, Public Health Laboratory
 Carl E. Wallace, B.S., 718 Medical Arts Bldg., Tacoma, Washington, City Bacteriologist

Public Health Education

- Anne Simpson Aller, M.A., 2508 Benvenue Ave., Berkeley, Calif. (Assoc.)
 Lu Crandall, A.B., 150½ Azard St., Auburn, Calif., Supervisor of Health, Placer County Schools
 Avis C. Eaton, M.D., 135 Stockton, San Francisco, Calif., Venereal Disease Clinics
 Russell Wilbur Force, D.D.S., 606 First Trust Bldg., Pasadena, Calif., Chairman, Clinic Committee, Pasadena Dental Association

- Honorio Hughes, 6115 Arcade Bldg., Seattle Wash., Executive Secretary of the Anti-Tuberculosis League of King County
 Elizabeth McFadden, A.B., 340 South 16th St., San Jose, Calif., Head, Health & Hygiene Dept., San Jose State Teachers College
 Henrietta Morris, Sc.D., 117 N. W. Trinity Place, Portland, Ore., Health Education Director, Oregon Tuberculosis Association
 Joseph Shilen, M.D., Leech Farm, Pittsburgh, Pa., Supt., Tuberculosis Sanitarium
 David B. Treat, A.B., 909 Berkeley Road, Phoenix, Ariz., Coördinator, Health Service, Phoenix Union High School
 Beatrice H. Woodward, R.N., 582 Market St., Room 802, San Francisco, Calif., Field Director, California Tuberculosis Association

Vital Statistics

- Francis C. Driscoll, A.B., Quincy Health Department, Quincy, Mass., Statistician

Public Health Engineering

- Claude H. Ballard, Blountville, Tenn., Sanitary Inspector
 Francis Wilson Kittrell, M.S., State Dept. of Public Health, Nashville, Tenn., Associate Sanitary Engineer

Child Hygiene

- Florence B. Jordan, State Board of Health, Helena, Mont., Assistant Director, Child Welfare Division

Public Health Nursing

- Edith B. Aldridge, R.N., Room 203, District Bldg., Washington, D. C., Supervisory Nurse, Child Hygiene Service, Health Department
 Myrtle C. Applegate, 554 S. Third St., Louisville, Ky., Supervisor, Public Health Nursing Assn.
 Helen Aydelott, R.N., 1230 Villa Place, Nashville, Tenn., Staff Nurse
 Alice Frances Boyer, Bureau of Child Hygiene, Room 304, State Department of Health, Trenton, N. J., Supervisor of Nurses
 Mary Brain, 275 Hubbard Ave., Salt Lake City, Utah, Metropolitan Nursing Service
 Agnes Brown, R.N., 1847 S. 6th East, Salt

Lake City, Utah, Nurse, Metropolitan Life Ins. Co.
 Florence B. Bussell, R.N., 1025 2nd Ave., Oakland, Calif., Supervisor of Nurses
 Rose K. Butler, R.N., 328 Maple St., Holyoke, Mass., Executive Director, Holyoke Visiting Nurse Association
 Loneta M. Campbell, 3001 Woodburn Ave., Cincinnati, O., Director, Visiting Nurse Association
 Frances E. Curtis, 122 North H St., Madera, Calif., County Health Nurse
 Margaret Douglas, R.N., Monteagle, Tenn., County Nurse, Grundy County
 Winifred L. Fitzpatrick, R.N., 100 North Main St., Providence, R. I., Director, District Nursing Association
 Alma E. Hartz, 403 City Hall, Cedar Rapids, Iowa, Director of Nursing
 Martha I. Hauk, A.B., Hackley School Bldg., Muskegon, Mich., Supervising School Nurse
 Bertha B. Holmes, Community House, Purchase, N. Y., Public Health and Community Nurse
 Margery Keeler, 28 Strawberry Hill Ave., Stamford, Conn., On Board of Stamford Visiting Nurse Association
 Linnie M. Laird, 2315 N.E. 43d Ave., Portland, Ore., School Nurse
 Pauline Marshall, R.N., 303 E. St., Salt Lake City, Utah, Metropolitan Nurse
 Martha McEntire, 67 Fontenelle Apts., Ogden, Utah, Metropolitan Life Insurance Co., Nurse
 Ada Cecelia McGrath, R.N., 174 N. Walnut St., East Orange, N. J., Supervisor of School Nurses
 Burtice A. Rees, 65 Court St., Buffalo, N. Y., State Supervisory Nurse
 Valeria Rittenhouse, R.N., University of Wyoming, Laramie, Wyo., University Nurse

Cornelia Roys, R.N., 402 West Main St., Lebanon, Tenn., Public Health Nurse, Wilson County
 Hilda Marie Schneider, Community Hospital, San Mateo County, San Mateo, Calif., Supervising Nurse
 Mary B. Scott, M.A., 14 Bank St., Fall River, Mass., Supt., District Nursing Association
 Josephine L. Shefner, R.N., Haskell Institute Hospital, Lawrence, Kansas, U. S. Indian Service
 Mary Elizabeth Stearns, R.N., 194 Concord St., Manchester, N. H., Supervisor of District Nursing Association
 Elizabeth S. Taylor, R.N., Bureau of Public Health Nursing, State Department of Health, Hartford, Conn., Director
 Justine L. B. Thorp, R.N., 318 W. Cedar St., Compton, Calif., School Nurse, Public Health Nurse
 Cornelia van Kooy, R.N., State Board of Health, Capitol, Madison, Wis., Director, Bureau of Public Health Nursing
 Dorothy A. Whitelock, 1040 Salem St., Chico, Calif., City Public Health Nurse

Epidemiology

A. M. Menzies, M.D., D.P.H., Provincial Board of Health, Victoria, B. C., Canada, Epidemiologist
 Richard M. Taylor, M.D., Institut Bouisson-Bertrand, Rue Ecole de Medecine, Montpellier (Herault) France, Field Director, International Health Division, Rockefeller Foundation (Assoc.)

Unaffiliated

William Andre Elfer, St. Rose, La., Member St. Charles Parish Board of Health
 George U. Wood, Peralta Hospital, 434 30th St., Oakland, Calif., Superintendent

NEWS FROM THE FIELD

U.S.P.H.S. ENGINEERS TRANSFERRED

INFORMATION has been received that Sanitary Engineer Arthur P. Miller, F.A.P.H.A., of the U. S. Public Health Service, has been transferred from Norfolk, Va., to New York, to take charge of that Service of Sanitary District No. 1. He is located in the Sub-Treasury Building, New York.

At the same time Sanitary Engineer L. M. Fisher, F.A.P.H.A., was transferred to Washington, D. C., to assume charge of Sanitary District No. 2, which was moved back to Washington, D. C., from Norfolk, Va.

LEAGUE OF MENTAL HYGIENE IN BRAZIL

THE National League of Mental Hygiene of Brazil, according to its recent report, has been giving most of its attention in the 10 years of its existence to a campaign against alcoholism, to physical examinations of persons intending to marry, particularly men, and to child guidance work. The child guidance clinic established by the league is working with mentally retarded or otherwise mentally abnormal children in some of the public schools of Rio de Janeiro. Each child is given a thorough physical and psychological examination, and a written report of his condition with the necessary advice is presented to the parents. The results of this work are highly praised in Brazil.—*Arquivos Brasileiros de Hygiene Mental*, Rio de Janeiro, 1933, vol. 6, No. 4.

TUBERCULOSIS CONFERENCE IN POLAND

THE Ninth Conference of the International Union Against Tuberculosis will be held in Warsaw, Poland, September 4-6. A special party is

being arranged to go from the United States, with a trip to Russia for those who can leave in advance. For information, write to the National Tuberculosis Assn., 50 West 50th Street, New York.

GERMAN HEALTH AND SAFETY MEASURES

THE rooms in which home work is done must be free from danger to the life, health, or morals of the workers. The Federal Minister of Labor may order for certain branches of industry or certain kinds of establishments measures for the protection of the workers' health, and also of public health; may entirely prohibit any home work that is combined with considerable danger to life, property, morals, or public health.

As under the old law, the employment of children of school age may be forbidden by the Minister of Labor, or the age limit may be raised.—*Reichsgesetzblatt*, Berlin, 1934, part I, p. 214; text of the home work law of 1923.

ITALIAN LAW REGULATING EMPLOYMENT OF WOMEN AND CHILDREN

EXTENT of Application of the Law—The Italian law of April 26, 1934, regulating the employment of women under 21 and of children under 15, supersedes the law of 1907 and its amendments. The new law is much more extensive in its application than the old; it applies to workers in a large number of occupations, including commercial ones, and to clerical as well as manual workers, whereas the old law applied only to manual workers in certain industries. The new law does not apply to domestic servants, home work-

ers, agricultural workers, maritime workers, employees of the National Government, of the provinces, nor of the communes.

BELGIUM—LAW REGULATING HOME WORK

INDUSTRIAL home work is regulated in Belgium, apparently for the first time, by a law passed February 10, 1934, which provides for the establishment of a national commission on industrial home work—the wages paid and the hygienic conditions under which such work is done. The commission is to include 3 employers and 3 workers, as well as a chairman not belonging to either class, who must be well versed in economic and social subjects. All the members are to be appointed by the King for 6 years. To aid in deciding on wages the commission may add temporarily to its membership 2 employers and 2 workers.

The commission is to have authority to make investigations with regard to wages and working conditions of home workers. At the request of workers or employers, it is to intercede in wage disputes and to recommend a minimum wage rate if the representatives of the workers and the employers fail to agree or if the wage rate that they agree upon is in its opinion too low. Payment of the wages recommended by the commission may be made compulsory by royal decree.

TYPHOID VACCINATION IN ILLINOIS

THE Illinois State Health Department has instituted a vaccination campaign against typhoid in 11 counties in southern Illinois. The work is being carried out in Jefferson and Fayette Counties and was scheduled to begin early in June in Saline, Williamson, Jackson, Union, Randolph and Madison Counties. It will be extended into remaining counties as soon as facilities permit.

NEW HEALTH UNIT IN MICHIGAN

THE establishment of the Van Buren County Health Department has been made possible by the W. K. Kellogg Foundation. Operation on a full-time basis was planned for July 1. The Foundation will supply most of the funds, it is stated, the state the usual annual subsidy of \$3,000 and the county office space and equipment.

HYGIENE AND SAFETY IN WORKSHOPS IN ITALY

THE workshops must be kept clean and well ventilated and must satisfy certain requirements of hygiene and safety; rules against overcrowding are prescribed. The factory-inspection office may forbid women and children to remain in the workshops during the rest periods.

Women under 21 and children under 15 may not be employed without obtaining an "employment book," in which is written a certificate of fitness, issued by a physician in the public service. In certain kinds of work, to be specified in a later decree, the employer will be required to provide physical examinations for women under 21 and children under 15 at regular intervals in order to ascertain whether they are able to continue the work; in certain dangerous, difficult, or unhealthful occupations such examinations may be prescribed for women of all ages and boys under 18.

In addition to providing for an increase in the number of workers subject to physical examinations, the law also provides for an increase in the number of examining physicians; besides the district health officers who made the examinations under the old law, physicians employed by public social welfare agencies, especially the National Bureau for Maternity and Infancy, will also be called upon to make such examinations.

Penalties are provided for violations

of the law, which will become effective at a date to be announced later.—*Gazzetta Ufficiale del Regno d'Italia*, Rome, No. 99 (Straordinario), 1934; translator's comment.

BIOGRAPHY OF DR. WELCH

THE trustees of Johns Hopkins University and its medical faculty have selected Dr. Simon Flexner, director of the Rockefeller Institute for Medical Research, to write the biography of the late Dr. William H. Welch.

ARIZONA PUBLIC HEALTH MEETING

THE Seventh Annual Meeting of the Arizona Public Health Association was held at Prescott, Ariz., June 5-6. A number of important papers were presented.

INTERNATIONAL LEAGUE AGAINST CANCER

AN International League for the Combat of Cancer was founded in Paris, March 24, 1934, at a meeting attended by representatives of 32 nations, it is reported. It is planned to have a permanent office in Paris and to publish a yearly report. The League also plans to organize an international convention in Rome, probably for 1936, to seek international coöperation in the field of statistics and in the campaign against quackery and in exchange of literature.

ANNUAL SCIENCE EXHIBITION

UNDER the auspices of the American Association for the Advancement of Science and Associated Societies, of Washington, D. C., there will be held an Annual Science Exhibition at Pittsburgh, Pa., December 27-30, 1934.

Special attractions announced are: exhibits and demonstrations in zoölogy, cosmic rays, deuterium, neutrons, induced radioactivity, stratosphere ex-

hibition, and talking films in the physical sciences from the University of Chicago, etc.

MEETING OF MILITARY SURGEONS

THE annual meeting of the Association of Military Surgeons of the United States will be held at the Medical Field Service School, Carlisle Barracks, Pa., October 8, 9, and 10, 1934. No papers will be read as the entire program is one of demonstrations in the field operation of the Medical Department. The members attending will live at the post and the expense will be very slight.

PERSONALS

PAUL J. ZENTAY, M.D., F.A.P.H.A., of St. Louis, was recently elected president of the Missouri Social Hygiene Association, succeeding Dr. Llewellyn Sale.

DR. FRANK A. TINKER, Health Officer of Lapeer, Mich., was given a banquet by the Lapeer County Medical Association recently in honor of his completion of 50 years in the practice of medicine. For the last 10 years he has been city health officer.

GRACE ABBOTT, member A.P.H.A., for 13 years Chief of the Children's Bureau, Washington, D. C., resigned her office recently, effective July 1. Miss Abbott will go to the University of Chicago to become Professor of Public Welfare Administration.

WILTON L. HALVERSON, M.D., member A.P.H.A., of Los Angeles, Calif., has been appointed Health Officer of Pasadena, Calif., succeeding Dr. Jay D. Dunshee, member A.P.H.A., who is now Health Director of the California State Department of Public Health.

GEORGE J. WHERRETT, M.D., member A.P.H.A., of Ottawa, Ont., Canada, has been appointed executive secre-

tary of the Canadian Tuberculosis Association. He succeeds Dr. Robert E. Wodehouse, member A.P.H.A., who was recently appointed Deputy Minister of Health in the Department of Pensions and National Health at Ottawa.

DR. W. W. PETER has been appointed Director of Medicine and Health of the Navajo Indian Reservation, under the U. S. Bureau of Indian Affairs. His address is Gallup, N. M.

DR. IRVING S. CUTTER, Dean of the Medical School, Northwestern University, Chicago, was appointed health editor of the *Chicago Tribune*. He succeeds Dr. William A. Evans, F.A.P.H.A., *Tribune* health editor since 1911, who is retiring.

MARGARET SANGSTER, young Navajo trained nurse, is the first full-blood American Indian public health nurse to go out to work among her people, under assignment of the Indian Bureau, to one of the Navajo community centers being developed under the new Indian policy instituted by the present administration. She recently finished her year of public health study at the Henry Street Settlement. Miss Sangster was born on the Navajo Reservation, was educated in an Indian Boarding school, and was then graduated in nursing from the Methodist Hospital in Los Angeles. For 3 years, following her graduation, she served as a nurse in the Indian Service at the Carson School Hospital in Stewart, Nev.

LEONARD GREENBURG, M.D., Fellow A.P.H.A., of the Yale University School of Medicine, New Haven, Conn., has been granted six months' leave of absence to take an appointment as acting Health Officer of the City of New Haven, in place of Dr. John L. Rice, now Health Commissioner of New York City. A permanent appointment is impossible at present on account of a city ordi-

nance requiring a year's residence for all appointees to municipal positions. Since there are no qualified candidates in New Haven who are able to take the position on a permanent basis, it is hoped that the ordinance may be modified before the end of the year.

CONFERENCES

Aug. 6-10, Annual Meeting of the American Dental Association, St. Paul, Minn.

Aug. 13-18, Twelfth International Veterinary Congress, New York, N. Y.

Aug. 15-24, Educational Exposition and Conference, under the auspices of the National Association of Public School Business Officials, New York, N. Y.

Aug. 31-Sept. 3, Third Institute on Health Education, under the auspices of the American Public Health Association, in connection with its 63rd Annual Meeting, Pasadena, Calif.

Sept. 2, State Laboratory Directors' Conference, for Directors of State Laboratories and their principal assistants only, University Club, Pasadena, Calif.

Sept. 3-6, 63rd Annual Meeting, American Public Health Association, Pasadena, Calif.; headquarters, Huntington Hotel and Maryland Hotel.

Sept. 4-6, 9th Conference of the International Union Against Tuberculosis, Warsaw, Poland.

Sept. 10-13, 13th annual scientific and clinical session of the American Congress of Physical Therapy, Philadelphia, Pa.

Oct. 8-10, Annual Meeting of the Association of Military Surgeons of the United States, Medical Field Service School, Carlisle Barracks, Pa.

Oct. 15-18, 17th Annual Meeting of the American Dietetic Association, Washington, D. C.

Oct. 15-19, American College of Surgeons, Boston, Mass.

Nov. 13-16, Southern Medical Association, San Antonio, Tex.

Dec. 27-30, Annual Science Exhibition of the American Association for the Advancement of Science and Associated Societies, Pittsburgh, Pa.

April 29-May 3, 1935, 19th Annual Clinical Session of the American College of Physicians, Philadelphia, Pa.

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SEPTEMBER 3-6, 1934

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Conference of State Laboratory Directors

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Western Branch, American Public Health Association

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Epidemic Cerebrospinal Meningitis in China

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Canton Hospital, Canton, China

EPIDEMIC meningitis like some other diseases has been considered to be relatively less common in China than in the West. It was interesting therefore to discover that several epidemics have already been reported extending over a wide range of the country, and as scientific medicine becomes more general the disease will, we believe, be found as prevalent in China as elsewhere in the world.

PAST INCIDENCE IN CHINA

The most complete epidemiological data at hand are those of the Health Department of the Shanghai Municipal Council.¹

In 1898 Dr. Arthur Stanley reported 3 deaths in the foreign community, from acute meningitis. There were none in 1899, 1 in 1900, 2 in 1901, and 1 in 1902. From 1903 to 1917 no cases were reported. From 1918 to 1928 there were a few deaths annually, there being 76 in 1920. In 1929 came the severe epidemic with 1,099 reported cases and 403 deaths. In 1930 and 1931 there was a marked drop (Table I).

For Hongkong² my references go back only to 1909, and from that year

to 1917 no cases were reported. In 1918 came the great epidemic, followed in succeeding years by a gradually falling incidence (Table I). For Macao I have depended entirely on the report of the 1932 epidemic by Dr. Perigrino da Costa.³ Only a few scattering cases are reported from 1918 to 1931 (Table I).

The history of the disease in Canton is veiled in obscurity except in so far as hospital reports go. In my own experience in Canton there has never been a serious epidemic of the disease. However, a personal note from the city department of health declares that in 1930 there were 257 cases reported with 223 deaths, and in 1931, 77 cases and 9 deaths. One must question seriously the accuracy of these data, because inquiry at the various city hospitals during those years showed that only sporadic cases were seen (see also Table I under Canton Hospital).

Many cases of convulsions in children and tuberculous meningitis in adults have been erroneously diagnosed epidemic meningitis.

The National Epidemic Prevention Bureau's Monthly Returns by Provinces, which, though my files are very

TABLE I
INCIDENCE OF CEREBROSPINAL MENINGITIS
IN DIFFERENT CITIES 1918-1932

Year	Shanghai		Hongkong		Macao		Canton		Canton Hospital	
	Cases (Residents only)	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths
1918	13	1	1,232	968	4				1	1
1919		15	269	204					0	0
1920		76	158	103	6				4	2
1921		29	114*		2				0	0
1922		12	49*		2				6	4
1923		5	106*						0	0
1924		7	32*							
1925		6	64*							
1926		8	13*							
1927		1	26*							
1928		20	21	16						
1929	1,099	403	25	20					3	0
1930	329	201	20	13	1				1	1
1931	292	174	25	16					5	2
1932	107	59	207	122	600	58%	174	36	31	9

* These figures were obtained from Dr. da Costa's Report on Macao, p. 8, and not from the Hongkong Sanitary Reports.

incomplete, report the disease from all of the 18 provinces except Kansu, from which many data are lacking.

PREVIOUS EPIDEMICS IN CHINA

Attention was first forcibly drawn to the occurrence of the disease in China by the Hongkong epidemic of 1918.^{1,2} The first case was reported February 9, but there had probably been cases in January. The maximum incidence occurred in March, after which there was a rapid decrease during April. There were reported 1,232 cases with a mortality of 76 per cent. During this period no cases were officially reported in Canton, but during the year there

was 1 fatal case admitted to the Canton Hospital.

The next important epidemic was that reported by Stevenson and Tang,³ who reported 700 to 800 cases occurring in Luchowfu, Anhwei Province, in 1919-1920. The maximum incidence was in February and March, a sudden change from warm to cold weather, with rain, causing a definite increase. Chief reliance was placed on spinal puncture, the average number per patient being only 3, while many had only 1. The mortality of untreated cases was estimated at 40 per cent; of the treated cases only 5 per cent.

A third important epidemic occurred

in Shanghai in 1929.⁷ It reached its height in the third week of April and there was a mortality rate of 46.4 per cent.

MENINGITIS IN 1932

When news came of the epidemic in Macao, many inferred that it had been carried by the thousands of refugees who poured into Macao, Hongkong, and Canton following the Japanese attack upon Shanghai. I therefore wrote to the Commissioner of Public Health of

the Shanghai Municipal Council, who replied June 9, 1932:

I have to state that in my opinion cerebrospinal fever has not been epidemic in Shanghai this year. . . . In regard to meningitis as a whole, it may be of interest to note that there is clear evidence this disease is not usually spread from Shanghai, but spreads to it from surrounding districts, or at any rate this was so during the last epidemic. . . . In regard to the theory that refugees from Shanghai spread meningitis over other portions of the country, I have to state that I cannot see any grounds for this at all. For some reason or other the theory that Shanghai

CHART A—Weekly incidence of meningitis at Macao, 7 Canton hospitals, Hongkong, and Shanghai—January 1 to July 2, 1932

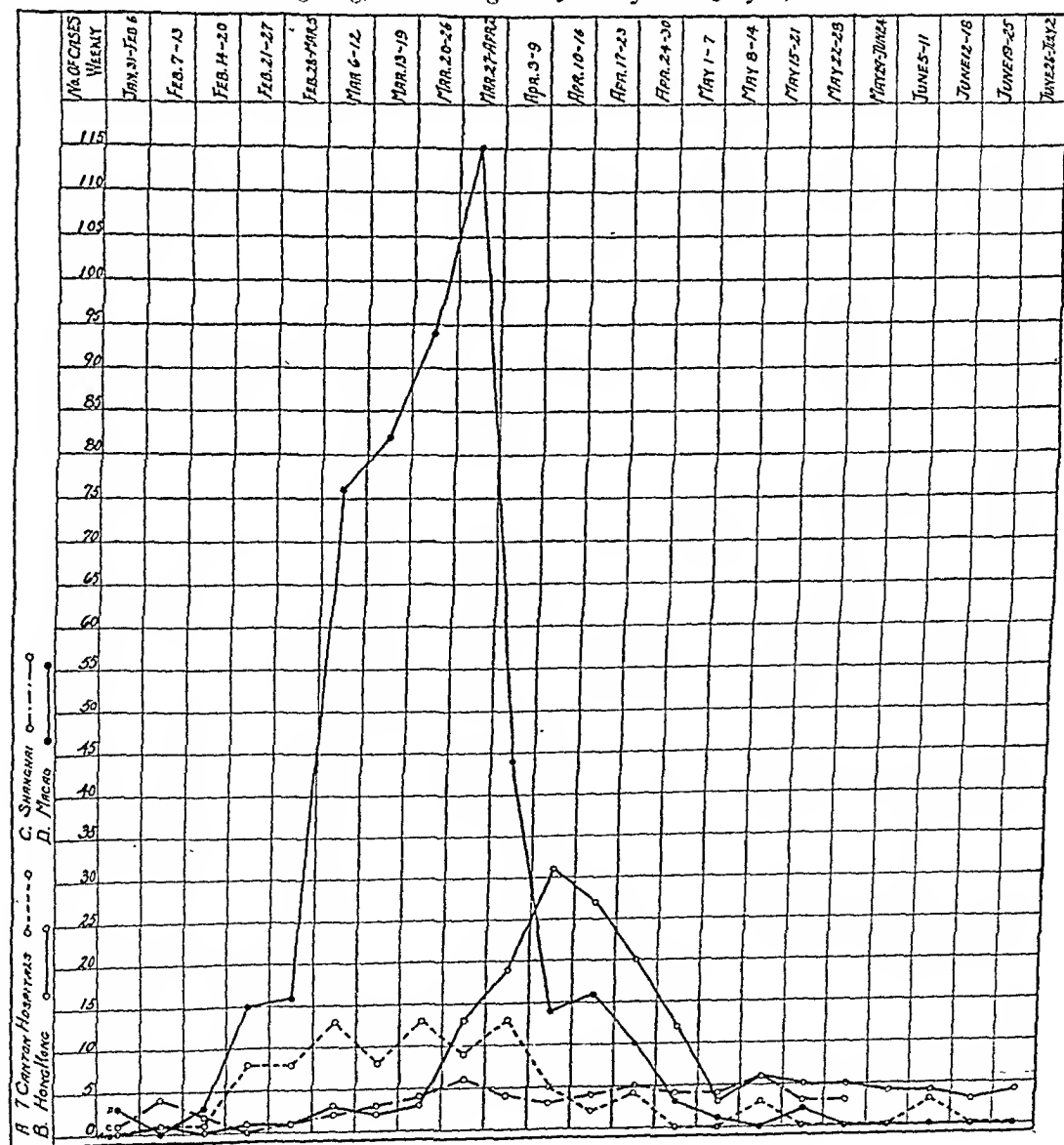
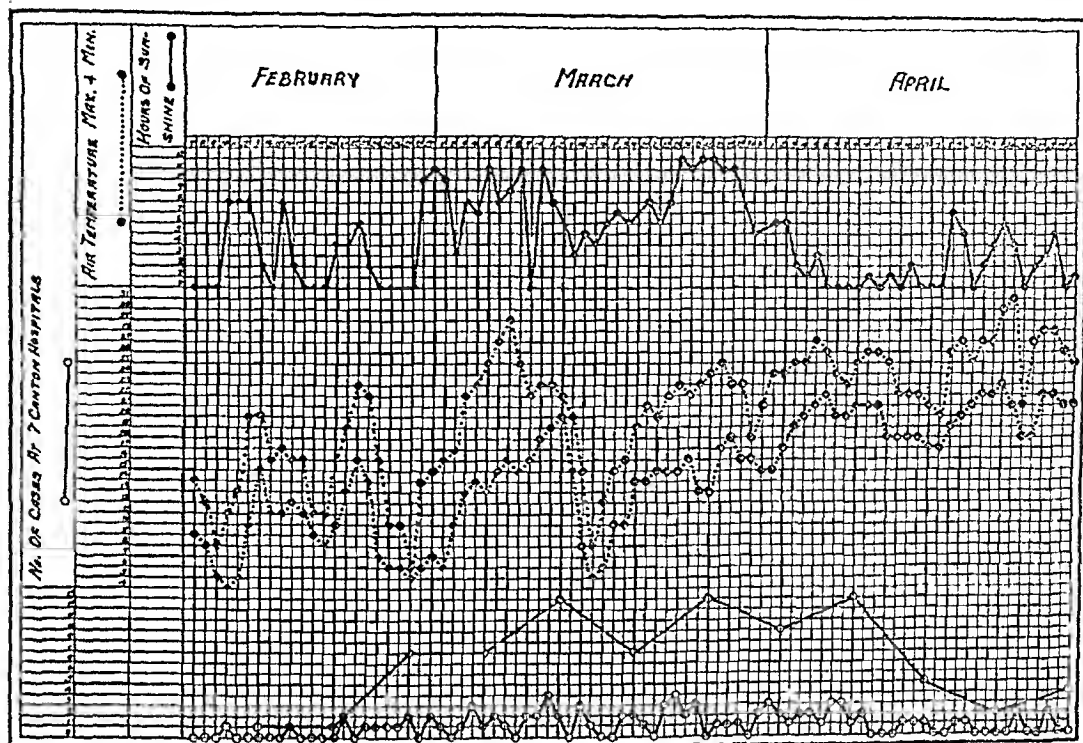


TABLE II
INCIDENCE OF MENINGITIS IN 4 CITIES IN 1932

Time Period	Canton		Hongkong	Shanghai	Macao
	Health Dept	7 Hospitals			
Jan. 1-30	6	4	5	12	1
Jan. 31-Feb. 6	2	0	0	1	3
Feb. 7-13	1	1	1	4	
Feb. 14-20	0	1	0	2	3
Feb. 21-27	0	8	1	0	15
Feb. 28-Mar. 5	1	8	1	1	16
Mar. 6-12	7	13	3	2	76
Mar. 13-19	7	8	2	3	82
Mar. 20-26	11	13	3	4	94
Mar. 27-Apr. 2	14	9	13	6	115
Apr. 3-9	9	13	19	4	44
Apr. 10-16	30	5	31	3	14
Apr. 17-23	18	2	27	4	16
Apr. 24-30	12	4	20	5	10
May 1-7	9		12	4	3
May 8-14	7		3	4	1
May 15-21	7	3	6	6	
May 22-28	0		5	3	2
May 29-June 4	1		5	3	
June 5-11	4		4		
June 12-18	4	3	4		0
June 19-25	2		3		
June 26-July 2	0		4		
July	14	3	5		1
August	3	1	7		1
September	3	1	5		1
October	0	0	3		1
November	1	0	7		0
December	1	1	8		0
Totals	174	101	207	71	499

CHART B—Hours of sunshine, maximum and minimum temperature (Centigrade) compared with the daily and weekly incidence of meningitis at 7 Canton hospitals during February, March, and April. Estimation is made as of day of onset of the disease.



acts as a reservoir for communicable diseases is a favorite one but is not, in my view, supported by evidence.

From January 2 to June 4, 1932, there were only 71 cases reported from Shanghai by the Commissioner of Health, among the resident population, although 58 additional cases among the non-resident population had occurred.

In Macao meningitis assumed truly epidemic proportions a detailed report of which has been prepared by Dr. P. J. Peregrino da Costa.³ By referring to Table I it will be noted that no epidemic had been previously recorded in the colony. The origin of the 1932 outbreak is unknown, but the disease was rampant in some of the country towns of the neighboring district of Chung Shaan. He suspects that refugees from North China, passing through Macao, brought the disease. The second case was a boy, who had

arrived 2 days previously from his native village. Other early cases apparently contracted the disease in Macao. Altogether some 600 cases occurred, in a population of over 100,000, but only 503 were proved.

In Hongkong 207 cases were reported, but the origin of the first cases has not been determined.

With regard to Canton, the data are, of course, far less reliable, and we have collected statistics from several of the leading hospitals in the city in addition to the cases reported by the health department. That these latter figures are only in part reliable is proved by the excessive numbers reported in 1930, when there was no epidemic apparent to workers in the different city hospitals.

For the 1932 epidemic I prepared a questionnaire which was distributed to the chief hospitals in Canton and vicinity. Data were asked for as to the

number of patients seen, with time of onset, duration of disease, and result; also age and sex of patients, number of spinal punctures made, cell count of spinal fluid and white blood cell count, amount of serum given, the occurrence of meningococci, and the presence of Kernig's Sign, headache, stiff neck, eruption, convulsions, and delirium; what measures appeared to be most beneficial in treatment, *i.e.*, spinal puncture, serum and others, and the origin of the epidemic.

Satisfactory replies were received from Canton Hospital, First Sun Yat Sen, David Gregg, Kwong Wah, Leung Kwong, and Kong Tsuen Hospitals. Brief statements were obtained from the Municipal Hospital and Dr. Todd.

From this information and the data from the Health Department, we are able to give the incidence of the Canton epidemic in relation to its appearance in other cities.

By reference to Tables II and III and to the Chart A, one can note that the epidemic appeared first in Macao, beginning in February, reaching its peak in March, and subsiding in April, after which month hardly any cases appeared. The same was practically true of those reported in 7 Canton hospitals where many cases occurred from March 6 to April 16, whereas the Canton Health Department showed the maximum about the middle of April. Cases are reported a week or more after their entrance to the hospitals, and for the 7 hospitals the time was estimated from the day of onset.

The Hongkong Health Department reports a maximum incidence in the middle of April, gradually diminishing in May and June. Thus the disease began in Macao, and was followed a little later by an outbreak in Canton, and the following month in Hongkong. In Shanghai the disease was never very prevalent, but in April and May the highest incidence occurred.

METEOROLOGICAL CONSIDERATIONS

Olitsky⁵ in his description of the 1918 epidemic in Hongkong states that the temperature had a marked influence on the incidence of the disease. When there occurred a sudden drop in the temperature the number of cases increased, and *vice versa*—the increase occurring about 4 days later. The influence of sunshine was also noted, a lack of it being followed by an increased incidence in the disease. Humidity and rainfall had little influence.

da Costa,³ in the 1932 epidemic in Macao, noted that whenever there occurred a pronounced difference between maximum and minimum temperatures on any given day, the number of cases increased after a few days, and concludes that humidity, rainfall, and lack of sunshine have little bearing on the incidence of the disease.

For the Canton cases we have charted (Chart B) the daily and weekly incidence, together with the daily records for hours of sunshine and maximum and minimum temperature, obtained at the Freeman Meteorological Observatory, Lingnan University. The week ending February 27 showed the first decided rise in incidence, following 4 sunless days and a precipitous drop in the temperature to 4°. A week later the temperature rose and there were several sunshiny days. The incidence remained the same. In April there were 2 weeks of sunless days, but moderate temperatures were followed by a gradual decline.

In February there were 12.99 cm. of rain, in March 9.9 cm. and in April 13.41 cm. The average humidity in February was 68 per cent, in March 79 per cent and in April 87 per cent.

The latitude of Shanghai is between 31° and 32° N. The latitudes of Canton, Hongkong, and Macao lie between the Tropic of Cancer and 22° N.

The available data do not reveal any striking correlation between the mete-

TABLE III
INCIDENCE OF DISEASE ACCORDING TO MONTHS IN 4 CITIES 1932

Month	Canton Health Dept.	Seven Canton Hospitals	Shanghai (Residents only)	Hongkong	Macao
Jan.	6	4	12	5	1
Feb.	3	10	7	2	23
March	26	46	10	9	355
April	83	28	22	110	117
May	23	4	17	26	5
June	11	3	39	16	0
July	14	3		9	1
Aug.	3	1		7	1
Sept.	3	1		5	1
Oct.	0	0		3	1
Nov.	1	0		7	0
Dec.	1	1		8	0
Totals	174	101	107	207	505

orological conditions and the rise and fall of the epidemic.

Sex—In the 7 hospitals there were 107 patients whose sex was reported. Of these 60, or 56 per cent, were males, and 47, or 44 per cent, females. In Macao 59 per cent and in Hongkong 65 per cent were males. At the Canton Hospital, of the 31 cases treated 71 per cent were males.

Age—The ages were recorded in 84 patients in 5 general hospitals in Canton: 10–20 years, 40 cases; 21–30 years, 21 cases; under 10 years, 19 cases (1 under 6 months); 31 and over, 4 cases.

It will be noted that nearly one-half of all the cases occurred in the 2nd decade, and one-fourth in the 3rd. Most of the remainder were under 10 years, but few were infants.

At Macao, most of the patients were under 10, but the 10–20 year group

were nearly as numerous. In the 3rd decade there were less than one-half the number in the 2nd, and in the 4th decade about one-half those in the 3rd. There were few over 40 years of age.

In the Hongkong epidemic of 1918, the peaks of the curve of incidence, according to age, were from infancy to 5 years and at 17½ years of age.

Duration of Illness—Most of our cases at Canton Hospital as well as in other hospitals were brought in on the 2nd to 4th day of illness, and all cases

TABLE IIIA

<i>Duration of Illness</i>	<i>Number of Cases</i>
2–5 days	26
6–10 days	28
11–15 days	10
16–20 days	15
21–30 days	10
31–40 days	5
41–50 days	3
over 50 days	7

had been ill more than 24 hours. Taking the records of 7 Canton hospitals, the total days of illness are distributed as shown in Table IIIA.

The periods of 6 to 10, and 2 to 5 days, were the most usual: 9 cases each were ill 4 and 6 days. One patient was reported as cured after 87 days, and 1 of the Canton Hospital cases suffered a relapse, but finally recovered after 46 days. We may say that recovery usually requires from 1 to 3 weeks.

Death usually occurred in less than a week after the onset.

MORTALITY STATISTICS

The death rate varies enormously in different epidemics.

In the Anhwei cases⁶ the mortality was estimated as 40 per cent for untreated cases and 5 per cent when a simple spinal puncture was performed. In the 1918 Hongkong epidemic the mortality was 76 per cent in spite of serum treatment and spinal puncture. In Shanghai, 1929, there were 46.4 per cent deaths. In 1932, Macao reports a death rate of 59 per cent in the 491 cases which entered the Isolation Hospital. The Medical Department of Hongkong reports a mortality rate of 58 per cent in 1932, while Shanghai had a death rate among residences of the settlement of 55 per cent. The Canton Health Department reported 21 per cent deaths.

In 6 of the Canton Hospitals, from January until June, including the period of the epidemic we have:

	Number of Cases	Deaths
Canton Hospital	26	5
Sin Yat Sen	26	12
Kwong Wah	14	4
Leung Kwong	14	7
Municipal	6	2
Total	86	30 = 34%

These cases were nearly all verified bacteriologically.

The death rate among later sporadic cases was greater than during the epidemic. At Canton Hospital there were 6 cases from June to September with 4 deaths.

Most fatal cases had been sick but a few days before admission and did not live long. Of 34 deaths in 5 hospitals, 11 had been sick 1 day before admission, 5, 2 days, and 7, 3 days. There were 2 each who had been sick for 4, 5, 6, and 7 days, 1 for 10 days, and 2 for over 14 days.

In Macao of 290 deaths, 63 died on the day of admission and 112 from the 2nd to the 5th day.

Spinal Puncture—This was always done in the lumbar region. It was usually done only once a day, and as symptoms abated, every other day or less frequently, depending on the temperature, the number of cells in the spinal fluid, headache, stiffness of the neck, etc.

At Canton Hospital no case was diagnosed epidemic meningitis unless a spinal puncture had been made and purulent fluid obtained. During the height of the epidemic a child was brought in with high fever, a very stiff neck, and severe headache. Spinal puncture was done and clear fluid obtained under increased pressure. The cell count was not increased. The next day the child showed typical signs of mumps, from which he made an uninterrupted recovery.

One case was punctured 16 times in 51 days and made a good recovery. A sporadic case was punctured 25 times during 41 days and also recovered. In the other Canton hospitals 18 was the highest number of punctures made, 2 or 3 being usual.

In the writer's opinion this procedure is by far the most important means of relieving symptoms and bringing about a cure. Dr. Valentine of Hongkong writes: "No improvement was observed in any case, unless lumbar punc-

ture had been performed." Dr. S. W. Phoon of Tung Wah Hospital, Hong-kong, reported that an average of 5 punctures were done per case when treatment was started early.

Spinal Fluid—The spinal fluid in true epidemic meningitis sooner or later becomes cloudy, due to the large number of leucocytes. This is important in the differential diagnosis from tuberculous meningitis, so common in South China. The number of cells, is, we believe, of definite value in determining the progress of the disease and as an indication for further punctures. In 24 of our cases diagnosed epidemic meningitis, meningococci were found. In these the maximum cell count was 3,900, and the minimum 730—average of 1,000 to 2,000. At the Kwong Wah Hospital counts of 15,000 to 18,000 were made. At the Sun Yat Sen Hospital, counts varied in positive cases from 32 to 5,120 cells.

The white blood cell count was invariably raised in the acute cases. In 5 hospitals there were 68 cases in which meningococci were demonstrated and in whom a leucocyte count of the blood was made. Deaths in these cases are shown in Tables IV and V.

TABLE IV

No. of W.B.C. in Blood	No. of Cases	No. of Deaths	% Deaths
9,000 or under	3	3	100%
10,000-14,000	28	6	21%
15,000-19,000	21	9	43%
20,000 and over	16	5	31%

The lowest white count, 7,600, was in a fatal case in whom meningococci were not found. One malignant fatal case had a leucocyte count of 38,000 cells and the spinal fluid was blood-tinged, but contained no meningococci. Of the positive cases the highest leucocyte count was 36,000, and this patient recovered.

We conclude that a white blood cell count of 10,000 to 14,000 is most

favorable; a lower count is very grave, and one above 15,000 is serious, but not so bad as the lower count.

OCCURRENCE OF MENINGOCOCCI

Naturally the presence of the organism in the spinal fluid is essential for making an absolute diagnosis of epidemic meningitis. On the other hand, it might be assumed that a case belonged to the epidemic variety: (1) when the spinal cell count exceeded 500; (2) when no other organisms could be found; (3) if the case recovered; in spite of the fact that repeated smears of spinal fluid failed to show the intracellular diplococci.

Thus a positive diagnosis was justifiable in several negative cases. Table V shows the percentage of positive cases in each hospital, judged by presence of meningococci.

TABLE V

Hospital	No. of Cases	No. Positive
Canton Hospital	31	24
Sun Yat Sen	23	19
Kwong Wah	14	14
Leung Kwong	14	13
David Gregg	13	8
Kong Tsuen	3	3
Total	98	81

About 83 per cent of the cases showed a positive bacteriological finding. In 1 of the hospitals all cases were positive. At Canton Hospital 17 per cent had a positive spinal fluid. In negative cases a search was made for the tubercle bacillus and pus forming organisms, without results, though there were, during 1932, several cases diagnosed tuberculous meningitis, in which the spinal cell count was relatively low and tubercle bacilli were demonstrated, or else no organism was found. All ended fatally.

CLINICAL SIGNS

The occurrence of the common clinical signs is recorded in Table VI.

It will be noted that of the 97 cases in 7 hospitals, 90 were reported with Kernig's sign, but it has been our observation that this is practically always present in genuine cases.

Delirium was recorded in 69 cases, but in 4 the absence was questionable. When a patient is at all conscious, stiffness of the neck is generally present.

Eruptions were conspicuous by their absence. Four cases with purpura were seen at the Sun Yat Sen Hospital, and 18 altogether in the series.

In Macao 50 per cent of the hospitalized cases had convulsions or delirium. There was only 1 case with a purpuric eruption.

Dr. S. W. Phoon reported on 75 cases observed at Tung Wah Hospital in Hongkong and states that Kernig's sign was present in all. Delirium and convulsions were rare, stiff neck was common.

TREATMENT

The one form of treatment of undisputed value is frequent lumbar puncture. Various palliative remedies for

control of restlessness and pain are of course to be utilized.

Serum was generally employed in our patients, but the actual benefit from its use may be questioned. The number of spinal punctures varied from 1 to 25. The amount of serum at each dose varied from 10 c.c. to 40 c.c.—usually 20 c.c.—the total amount from 10 c.c. to 285 c.c.

Thus the majority of patients treated in Canton were given one form or another of antimeningococcic serum. I have found none of the Canton doctors very enthusiastic over its therapeutic value, aside from the effect of spinal puncture alone. The sera used were all polyvalent.

SUMMARY

1. Epidemic cerebrospinal meningitis first manifested itself in China in epidemic form at Hongkong in 1918. It became more severe in the 4th week of March and continued to be prevalent until the 2nd week of May. Other epidemics have been reported from Anhwei in 1920 and Shanghai in 1929.

TABLE VI
CLINICAL SIGNS

Name of Hospital	Cases Reported	Kernig's Sign	Headache	Delirium	Stiff Neck	Convulsions	Eruption	
Canton Hospital	31	27	29	17	27	6	1	
Sun Yat Sen	23	23	23	16	17	3	5	4 purpura
Kwong Wah	14	11	13	10	11	9	2	
Leung Kwong	14	14	14	11	14	8	5	
Municipal	6	6	6	6	6	6	4	
David Gregg	6	6	6	6	6	3	0	
Kong Tuen	3	3	3	3	3	3	1	
Total	97	90	94	69	84	38	18	

2. In 1932 the disease appeared in Macao in epidemic form for the first time in the 4th week of February. It reached its height in March, subsiding during April, and practically ceased early in May.

3. For Canton, according to Health Department statistics, the disease began to increase in the 1st week of March, and continued to be prevalent until the middle of May. Reports from 7 Canton hospitals indicate that the epidemic began in the 3rd week of February and lasted till the end of April.

4. The meteorological conditions in Canton seemed to have little effect on the epidemic.

5. Spinal puncture is essential for accurate diagnosis. It is the most effective therapeutic measure available.

6. Polyvalent anti - meningococcic

serum was generally employed intravenously, intramuscularly, and subcutaneously. No especial advantage was noted for these latter methods over the intrathecal. Several brands of serum were employed with no particular preference for any one.

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Johann Peter Frank

DIFFICULT as it is to make a critical study of as vast a work as the "Medizinische Polizey" it is yet more difficult to write an appreciation of it. Although the "System" is judged to be the first modern comprehensive attempt to codify the details of public health administration, little attempt has been made to trace what influence it may have had on the subsequent history of public health. To judge whether Frank was more than a curiosity, a man whose ideals were thoroughly modern but who had little influence, is a major problem in itself. The analyses of his ideas given in this paper can make possible such an evaluation.

To elaborate praises of Frank's penetrating thought, his vision, and his scholarly treatment of his subject would be useless. If these things do not speak for themselves no one can speak for them. To assume a condescending

air and smile at his faith in the power of legislation, his inclusion of much superstition and prejudice with the more enduring matter of his discussion, would be equally useless. Kratter¹ in 1888 made an observation which will perhaps serve better as epilogue than anything else which could be said:

If anyone has leisure and desires to refresh himself with a language which has not yet buried thought beneath a professional idiom but still conveys it without embarrassment or reservation, and if anyone enjoys a frank delineation of social conditions—let him read Frank.—By Leona Baumgartner and Elizabeth Mapelsden Ramsey, *Annals of Medical History*, Vol. 6, No. 1 (Jan.), 1934, p. 83.

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Relation of Soil Fertilization with Superphosphates and Rock Phosphate to Fluorine Content of Plants and Drainage Waters*

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THERE is a widespread interest in fluorine in relation to human and animal life because of its known toxicity and production of mottled teeth in man¹ when ingested in too great a concentration with drinking water. It is well known that rock phosphate from any source contains about 3.5 per cent of fluorine. The application of 1,000 lb. of this material to an acre will add 35 lb. of fluorine. In the prevailing sulphuric acid method for the manufacture of superphosphate, a part of the fluorine is lost or reduced by virtue of dilution with calcium sulphate. Analysis of commercial superphosphate shows a fluorine content of about 1.86 per cent. The fluorine content is about one-half that of rock phosphate.² Where electric furnace methods of manufacture of superphosphate—fusion with silicon and carbon—are used, the product is practically free from fluorine. This product finds its use in such materials as baking powders and pure chemicals. It has been the practice in this and other countries since the development of the mineral theory of plant nutrition

to fertilize our soils with superphosphates, and more recently to use the rock phosphate directly. Hopkins³ at the University of Illinois, was a strong advocate of the direct use of rock phosphate in soil building, advocating applications of 1,000 to 2,000 lb. per acre every few years.

Because of our interest in the fluorine problem growing out of an extended investigation of the effect of feeding rock phosphate to animals, we undertook an investigation of the effect of continued fertilization with fluorine-phosphate carriers on the fluorine content of plant materials and drainage waters. There are several agricultural experiment stations in this country where fertilization with rock phosphate, superphosphate, and bone meal has been in progress for a quarter to half a century, and it was to these stations that we sent in 1933 for the plant materials. We had the coöperation of the stations of Illinois, Indiana, Ohio, Pennsylvania, Tennessee, and Wisconsin.*

From the Ohio Station we secured

* Published with the permission of the Director of the Wisconsin Agricultural Experiment Station.

* Our thanks are due to Dr. Burlison of Illinois, Dr. Wiancko of Indiana, Dr. Barnes of Ohio, Dr. Gardner of Pennsylvania, Dr. MacIntire of Tennessee, and Dr. Musbach of Wisconsin, for their coöperation in securing these samples.

materials from plots that had had rock phosphate treatment for 36 years. Seventeen years of treatment was the shortest period for any plot record. The materials collected consisted of wheat and oats in two cases, plus wheat straw, oat straw, alfalfa, cow pea hay, and mixed hays. The samples were analyzed on an air-dried basis, and the fluorine is expressed in milligrams of air-dried material per kilo. The analysis was made by Armstrong's modification of Willard and Winter's method.⁴ The results are given in Table I.

In one column there is an estimation of the amount of fluorine per acre received by the rock phosphate treatment during the entire period of fertilization, varying from 326 lb. in 17 years on the Illinois plot to 60 lb. on the Pennsylvania plot. The estimate is based on the amount of rock phosphate applied and an assumed fluorine content of 3.5 per cent. No estimation was made of the fluorine contributed by the other fertilizers.

There is considerable variation in the fluorine content of these plant materials, from 0.26 mg. per kilo in the wheat grain grown on the bone meal plot of Tennessee, to 2 mg. per kilo in the alfalfa grown on the superphosphate plot at Marshfield, Wis. One factor in this variation is the soil type and its geology. One can find little evidence from the data that the application of rock phosphate or acid phosphate has consistently increased the fluorine content of the plants above that of plants grown on soils receiving bone meal or a low fluorine application. In some instances the plan of fertilization involved the application of phosphorus in equivalent amounts, which makes it probable that in such cases the amount of fluorine added was as high in the superphosphate application as in the rock phosphate treated plots.

In no case had the level of fluorine

in the plant tissue analyzed risen to the point of making it dangerous as a source of food for animals. The highest recorded fluorine content was 2 mg. per kilo in alfalfa grown on the superphosphate treated soil at Marshfield, Wis. A cow consuming 20 kilos daily of such roughage would ingest 40 mg. From extensive work at this station the upper limit of safety for a dairy cow is 2.5–3 mg. of fluorine daily per kilo of body weight, or 1,000 to 1,200 mg. These data apparently place the plant tissue analyzed from the rock phosphate and superphosphate treated plots beyond the suspicion of imparting any serious element of danger when used as food materials. What a longer period of application may do should be studied.

Since the plants growing on these high fluorine plots had not shown significant or dangerous increments of fluorine in the periods studied from the standpoint of animal nutrition, we turned to a study of the influence of such fertilization on the fluorine content of drainage water. Fortunately we had the coöperation of Dr. MacIntire, of the Tennessee Agricultural Experiment Station, Knoxville, where lysimeters are in operation under different soil treatments. In January, 1934, following a period of drought, we secured from Dr. MacIntire three samples of water draining through Chickamauga limestone, untreated and treated with superphosphate and rock phosphate. Three additional samples of water from the same plots were sent May, 1934. The soils received the phosphate treatment beginning in 1930 and continued annually through 1933. The annual treatment was made on the basis of 96 lb. of P_2O_5 equivalence per acre. We calculated that this application in the case of rock phosphate during the 4 years has been about 53.7 lb. of fluorine per acre. The data are given in Table II. The analyses were

TABLE I
FLUORINE IN PLANT TISSUE FROM PLOTS RECEIVING
VARYING AMOUNTS OF FLUORINE

Place	Time	Treatment	Amount of F lb. per Acre	Plant	Found Mg. per K — air dried
Wisconsin (Marshfield)	1913-33	Manure	140	Alfalfa	1.7
		Manure + R.P.		"	1.6
		Manure + Super		"	2.0
Indiana (Lafayette)	1916-33	Manure	161	Mixed hay	0.82
		Manure + R.P.		"	1.62
		Manure + Super		"	1.72
		Manure + B.M.		"	1.30
Pennsylvania (State College)	1916-33	No fertilizer	60	Wheat	0.82
		R.P.		grain	0.94
		Super			0.99
		B.M.			0.32
Pennsylvania (State College)	1916-33	No fertilizer	60	Clover	0.76
		R.P.		and	0.90
		Super		timothy	0.52
		B.M.			0.57
Ohio (Wooster)	1897-33	No treatment	134	Alfalfa	0.81
		R.P.			1.57
		Super			1.33
Illinois (Aledo Fields)	1916-33	No treatment	326	Oat grain	1.25
		R.P.			1.75
		Super			0.70
		B.M.			1.66
Illinois (Aledo Fields)	1916-33	No treatment	326	Oat straw	0.58
		R.P.			0.93
		Super			1.37
		B.M.			0.64
Tennessee (Knoxville)	1905-33	No treatment	97	Wheat grain	0.30
		R.P.			0.48
		Super			0.46
		B.M.			0.26
Tennessee (Knoxville)	1905-33	No treatment	97	Wheat straw	0.30
		R.P.			0.51
		Super			0.73
		B.M.			0.56
Tennessee (Knoxville)	1905-33	R.P.	294	Cow pea hay	0.95
		Super			0.61
		B.M.			0.63

R.P. = Rock phosphate
Super = Acid phosphate
B.M. = Bone meal

made by the same method as used for the plant tissue.

The data indicate that the phosphate treated areas have led to a marked increase in the fluorine content of the drainage waters, particularly the rock

phosphate treated soil. Possibly in both instances—rock phosphate and superphosphate treatment—the fluorine largely escapes into the drainage water, but its rate of escape may be related to its original availability. To answer such questions periodic analyses would be necessary. In one instance—rock

TABLE II
FLUORINE IN DRAINAGE WATERS FROM
SOILS RECEIVING VARYING APPLICATIONS
OF F-CARRYING PHOSPHATES

Place and time of collection	Time of treatment	Treatment	Am't of F per acre	Mg. per liter
Knoxville, Tennessee Jan., 1934	1930-33	Control	—	0.044
		Super R.P.	53.7	0.084 1.710
May, 1934	"	Control	—	0.050
		Super R.P.	53.7	0.106 0.118

phosphate treatment—the concentration of fluorine in the water (1.7 mg. per liter) approached the level recorded as sufficient to induce mottling in teeth,¹ namely, 2 mg. per lit. This figure may be unusually high due to the preceding drought and possible concentration of the fluorine in a limited drainage volume. The total volume of drainage water of a year or more and the fluorine concentration therein would be a more accurate method of gauging the degree of contamination. However, if in a 40 in. rainfall there were an actual drainage volume of 10 in., the concentration of fluorine per lit. could amount to 6.3 mg. if all the fluorine were dissolved in the drainage water and the application of rock phosphate had been 400 lb. per acre—not an unusual application.

DISCUSSION

These data raise the question whether our present systems of soil fertilization with fluorine-carrying phosphates may lead to a contamination of drinking waters to a point where they may become dangerous to human health. No attempt is made from these limited data to give an answer, our only purpose being to call attention to it. Already health authorities are making tests for fluorine in public drinking

supplies, for the most part qualitative and not quantitative. No attempt, so far as we know, has been made to trace the origin of this fluorine contamination. It no doubt comes from the phosphorite-bearing rocks of the drainage areas. No one would suppose that the more recent recognition of fluorine as a deleterious contaminant of drinking water when in too high a concentration is in any way associated with phosphate fertilizer application, which has neither been of long duration nor on an extensive scale except in limited localities. Is there danger in a century or two of such application? Should public health warrant it, there is probably no reason why phosphate fertilizers cannot be prepared by methods already available that could largely eliminate fluorine contamination—the electric furnace and fuel-fired furnace processes, both of which are able to produce a phosphate of low fluorine content. Cheap power and public demand may be important factors in bringing about this change if it should prove necessary.

SUMMARY

1. Plant materials from plots receiving fluorine-carrying phosphates, such as rock phosphate and acid phosphate, for periods of 16 to 36 years did not show consistent or greatly increased fluorine content over plant materials grown on plots receiving a low fluorine carrying phosphate such as bone meal.

2. Drainage water from a single series of lysimeters in Chickamauga soil at Knoxville, Tenn., showed a particularly high fluorine content where the soil had been treated with rock phosphate, and a definitely increased fluorine content when treated with superphosphate as compared to the control.

3. These results in respect to drainage water raise the important question as to the ultimate influence of our present system of fertilization with rock phosphate or superphosphate as now manufactured upon the fluorine content of drinking waters and their relation to public health.

4. With our limited available data nothing further is intended in this article than to call to the attention of public health officials,

I am wondering if universal service will be as efficient.

I am wondering if we, as health workers, have failed in our educational efforts, and public appreciation of the care of disease is greater than its prevention.

I am wondering if all our ideals of public health administration and service are incorrect, and we are not keeping abreast of social changes and present-day exigencies.

I am wondering if in our anxiety to maintain our existence and in our envy

of those who are receiving large sums of emergency relief funds we are willing to sacrifice the ideals built up by tried and proven experiment.

I am wondering if this proposal to place medical relief activities under public health auspices is not, after all, a tribute to the sociological training and organizing ability of public health leaders; but—

I am wondering if it does not mean that we are to be relegated to the position of "Doctor Bull" of several decades ago.

Is Cancer Becoming More Prevalent?

THAT diseases like cancer, diabetes and diseases of the heart and arteries, all of which are associated with the older ages, should show an increase in the registered death rates is natural, for there has been a marked aging of the population. In New York City, for example, the proportion of persons over 45 years of age is now one-third greater than it was only a generation ago. No one denies that this aging of the population has brought with it an increase in the death rate of the diseases associated with the older ages. But as the heading of this article is usually interpreted there are those who believe that, apart from the age factor, some or all of the diseases mentioned above have actually become more prevalent in recent years.

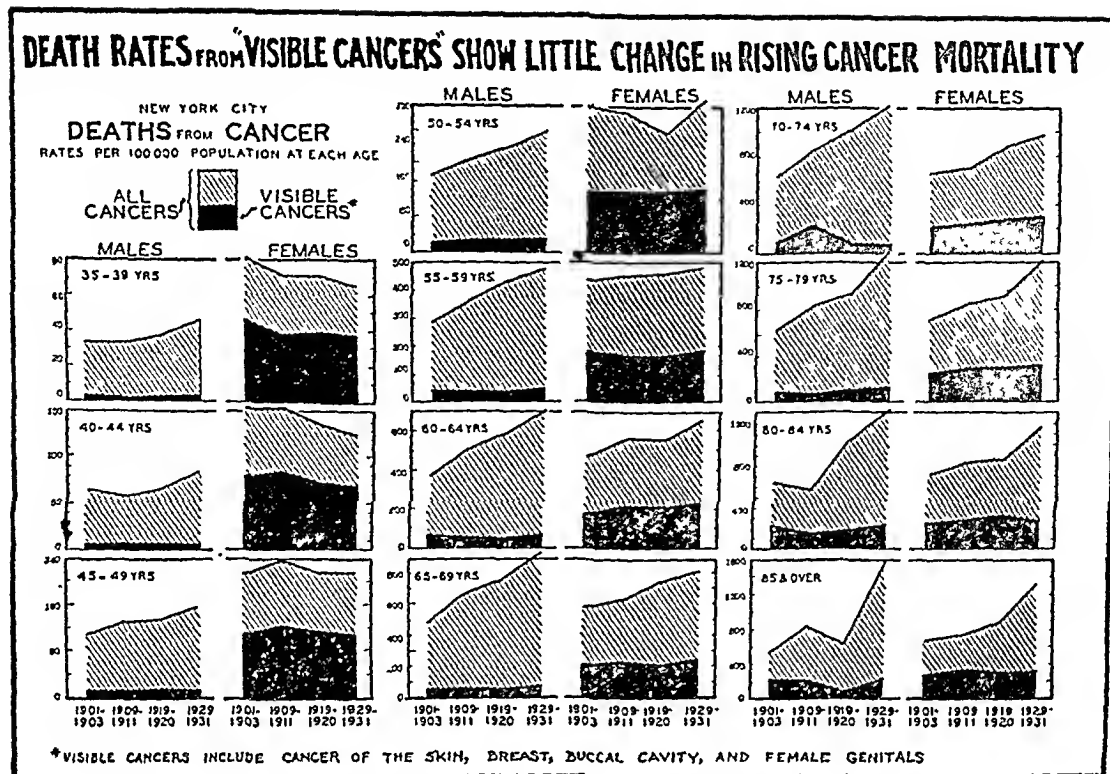
The actual number of deaths involved in cancer, diabetes, and diseases of the heart and arteries is so great that a real increased prevalence, beyond that due to aging of the population, should manifest itself by an increase in the specific death rates in the higher age groups. However, when we examine the specific death rates for New York City

no such increase can be discovered. In fact, the specific death rates, even in the higher age groups, show a decline during the past thirty years.

It is instructive to analyze the course of our cancer death rate, not for all forms of cancer, but, as is done below, for "visible" and "other" forms of cancer. In this way we deal with one of the important factors which must be reckoned with, namely, diagnosis. Under the heading "visible" cancers we have included cancer of the skin, breast, buccal cavity, and female genitals. Some idea of the number of deaths involved under the term "visible" cancers can be gained from the following figures showing such cancer deaths during the three years 1929-31:

	Males	Females
Cancer of the skin	212	81
Cancer of the breast	32	2,158
Cancer of the buccal cavity	718	111
Cancer of female genitals . . . . .	...	2,651
Total	962	5,001

The graph tells its own story. Whereas the death rate charged to cancer generally shows an upward trend



during the past 30 years, the death rate from "visible" cancers shows practically no change. If cancer were actually becoming more prevalent in the various age groups, it would be strange

not to have the visible cancers participate in this increase. . . .—Charles Bolduan and Louis Weiner. *Quart. Bull.*, Dept. of Health, New York, N. Y. 11, 1, 1934.

Dermatitis in the Oil Refining Industry*

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THIS paper is based on a study of 8 oil refineries employing about 14,000 men, of whom 4,500 were actually examined for the occurrence of dermatitis, and also on the sickness records of 11,000 of them over a period of 2 years.

The refineries studied used all varieties of crude oil obtained from North and South America, such as Pennsylvania, California, Ranger, Mid-Continental, Mexican, Peruvian, Venezuelan, and Texan. These crudes are classified as having paraffin, asphalt, naphthenic or mixed bases, and their character, as well as the final products desired, determines the refining process.

There were no marked differences in the skin conditions found in the various refineries using different crudes, except in those refineries where a paraffin base crude was used in the manufacture of paraffin.

PROCESS

The crude oil is distilled in batteries of stills and a number of cuts are made at different times in the process. Coke is the final residue in the still except where an asphalt base crude is used.

To remove various deleterious products from the distillates they are treated with sulphuric acid, caustic soda, fuller's earth, liquid sulphur dioxide, and sometimes "sweetening" with litharge and flowers of sulphur, or with

sodium hypochlorite and chloride of lime.

Paraffin is obtained from the paraffin distillate of a paraffin base crude by passing it through a cooled plate press where the wax collects on the plates. The press is then opened and the wax is scraped off by hand, then purified by repeated "sweating" and by passing through bone black.

Some refineries manufacture various by-products, such as insecticides, greases, and wax products. The insecticides are made by using extract of pyrethrum flowers in various petroleum distillates. Greases are manufactured by mixing soap and lubricating oil in various proportions. Candles are made of paraffin by molding, or by dipping wicks repeatedly in the molten paraffin until the required thickness is acquired. Aniline dyes are used for coloring. No cases of dermatitis were observed in either the grease or the candle making, but many cases of dermatitis occurred in the manufacture of insecticides, due to hypersensitivity to pyrethrum flowers.

PRESENT SURVEY

The sickness records showed that 196 cases diagnosed as industrial dermatitis occurred among 11,000 workers during the period of 2 years.

In 1 refinery, where complete records were kept, of 16,000 treatments, 202 were skin cases which may have been of industrial origin, or about $1\frac{1}{4}$ per cent, and 128 skin cases that were diagnosed as not of industrial origin.

* Read before the Industrial Hygiene Section of the American Public Health Association at the Sixty-second Annual Meeting in Indianapolis, Ind., October 10, 1933.

In the present survey, 488 skin conditions were found, of which 25 were distinctly not of industrial origin.

The chief skin hazards in oil refining seem to be burns from explosions and fires, or from acids and alkalis. Oil acne and papillomata, as well as an excessive amount of epithelioma, result from oil and paraffin.

About 10 per cent of those examined showed on the dorsum of the hands and on the forearms, and sometimes even on the legs, many pin-head to pea-size flat, small, pigmented papillomata. These occur in greater proportion among machinists, mechanics, and laborers, whose hands are usually covered with oil, grease, and dirt. A similar condition has been described as occurring in about 25 per cent of men working in Dutch briquette factories.

Telangiectatic spots were found on the exposed parts of the skin of many of the laborers. They were from pin-head to dime size, and disappeared on stretching of the skin. They are caused by exposure to hot coke when cleaning out the residue from the stills, and also from dipping the hands into hot paraffin during the "sweating" process. It was noted that colored laborers did not show these spots.

Many observers have noted an excessive number of skin cancers among workers in oil and wax. In this study, 12 cases were encountered—3 on the face, 6 on the lip, 1 on the hand, 1 on the ear, and 1 on the scrotum. The last was on a paraffin pressman who also had an epithelioma on the dorsum of the hand.

Three of the refineries examined pressed paraffin, and 81 men who worked on the presses were examined. Characteristic wax warts were found on the hands and forearms of 25 of them. These wax warts differ in appearance from the papillomata described among workers in oil and grease. They are more raised, more verrucous, non-

pigmented, and often occur on the inner surfaces, as well as the dorsum of the forearms and hands.

Among 81 paraffin pressmen, 19 cases of oil acne were found. Oil acne differs from acne vulgaris in that it occurs not on the face, but on the arms, the shoulders, the body, and the legs, and forms around the hair follicle. The lesions of oil acne are elevated, erythematous, indurated, and about pea size, and when they suppurate are known as wax boils. One case of epithelioma of the scrotum was found. This man also had many wax warts on his hands and forearms, one of which was undergoing epitheliomatous changes.

Burns are frequent in oil refineries. They occur from fires, explosions, cleaning hot coke from the stills, and also from the acids and caustics used in the refining process.

When acid tanks are being cleaned of sludge, and in that part of the plant where sulphuric acid is recovered and reconcentrated, acid burns are of frequent occurrence.

The tanks in which the oil and gasoline are neutralized with caustic soda must be cleaned at regular intervals, and caustic burns occur during this process, from contact with the caustic deposited on the sides of the tank. The cleaning of old barrels with caustic soda occasionally causes a dermatitis in a sensitive worker.

Sometimes a worker is met with, who after a number of years of work in the refinery becomes sensitized to gasoline and develops chronic dermatitis.

Epidermophytoses and trichophytides occur among refinery workers, as well as among the rest of the population, and are often mistaken for dermatitis of industrial origin. In the present study no attempt was made to examine the feet of the workers for tinea infections, but 11 cases of tinea of the hands and 1 of monilia infection of the webs of the fingers were found.

PREVENTIVE MEASURES

Most of the refineries provide safety appliances for the prevention of burns from acids, caustics, and coke. These appliances consist of rubber suits, goggles, and gas masks, which the men are compelled to wear when entering acid or caustic tanks. Nearly all of the refineries have shower baths placed throughout the area where acid and alkali burns are apt to occur, so that men splashed can immediately step under the showers. There are also large bath tubs filled with water so that men when burned can be immediately plunged into them.

The burns in coke stills usually occur in the old-style type, where there are manholes through which the men must enter to clean them. These are being replaced as soon as they are worn out with new-style ones in which mechanical means are employed for cleaning out the coke.

The pigmented papillomata occurring among workers in oil and grease could in a large measure be prevented by the compulsory wearing of gloves and compelling the men to wash their hands with soap and water at noon, before eating their lunch and immediately after they stop work for the day.

Oil acne and wax warts among the paraffin pressmen can also be prevented by compelling them to take shower baths, using plenty of soap, immediately after stopping work for the day, and changing to clean clothes. They should also be compelled to have their working clothes washed once a week because they become saturated with oil. In addition to this, the maintenance of an efficient medical and first-aid department, preferably with a full-time medical officer and a registered nurse, physical examination of new employees, and yearly examination of all employees are recommended.

The Controversy About Pasteurized Milk

THE controversy on the pasteurization of milk, described in previous letters, has been continued in the *Times*. A. Bradford Hill, W. W. Jameson and W. W. C. Topley, of the London School of Hygiene and Tropical Medicine, reply to the argument that in a population of 9,000,000 children in this country under the age of 15 only about 4,000 cases of bovine tuberculosis occur annually, or 1 case in 2,200 children per annum. The proportion of children who eventually suffer must be much higher. It can be estimated that between 1 in

100 and 1 in 200 children develop the disease before the age of 15. Milk-borne diseases other than tuberculosis are by no means as negligible as the opponents of pasteurization state. Between 1912 and 1931 there were reported at least 81 outbreaks of various diseases due to milk. In 1929 there occurred a severe epidemic of septic sore throat involving more than 1,000 families, with 65 deaths, and in 1931 an outbreak of 312 cases of paratyphoid fever, with 6 deaths.—London Letter, *J.A.M.A.*, June 23, 1934, p. 2124.

What Can We Learn from Child Health Conditions in Europe?*

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REFLECTION upon the evolution of maternal and child care in Europe at once brings to mind our indebtedness to the pioneers in antenatal hygiene, infant metabolism, nutrition, and child sociology. We hold in grateful appreciation the work of a galaxy of European scientists who have laid firm foundations upon which we have builded in the fields of sanitation, preventive pediatrics, and social medicine. Our technics and organization for prenatal centers, maternity benefits, milk stations, infant welfare clinics, day nurseries, nursery schools, and school hygiene bear the original imprint of contributions from abroad. These we have adapted, with minor modifications, to American conditions, and have added certain unique features of our own.

It is not the intention of this paper, however, to dwell upon historical developments. That has been done exceedingly well by others. The purpose here is to sketch in outline present-day conditions and trends in some of the European countries, which may suggest to us ways and means of improving our own maternal and child health.

In Europe child hygiene is considered a definite part of the public health and is integrated with every other health function in the community. The trend abroad in administration of all welfare

measures is decidedly in the direction of public control, concentrating authority in the hands of full-time, technically trained, public officials. Voluntary organizations may, and do, carry on certain phases of maternal and child health work, but always in close cooperation with official agencies.

It is recognized that the first duty of the state is to protect its mothers and children and to promote their welfare. This has been done abroad largely through some form of social insurance, which is undoubtedly one of the strong points of the European system.

An amazing fact in Europe today is the foresight and vigor with which governmental schemes for maternal and child health are being pursued. Wherever we look—in democratic England, bureaucratic France, Fascist Italy, Nazi Germany, Nazi-Fascist Austria, Communistic Russia, or dictatorial Yugoslavia and Poland—similar phenomena present themselves. Whatever the form of government, a desperate struggle is on to preserve, strengthen, and extend services for the welfare of mothers and children. Economic distress appears to be the only inhibiting factor. Mixed motives—humanitarian, utilitarian, socialistic, and militaristic—are discernable; but the net outcome in each instance is more active interest in the health and well-being of mothers and children and more ample provisions for them. In this very fact itself lies a great lesson for America.

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England—From the beginning of the 20th century a code of regulations for the health protection of mothers, prospective mothers, and children has been developing in England, Scotland, and Wales. The most recent act—The Children and Young Persons Act of 1932 Amending the Children's Act, 1908—consolidates various public health and welfare measures for children. It extends the powers of health visitors and public health nurses in the welfare schemes. The duties of health visitors and school nurses may be merged and carried out under local authorities. The health visitors may be qualified as midwives, and many of them are performing this function satisfactorily in the counties of England.

There is much better control of midwifery in most European countries than in America. More adequate facilities are available for the training and supervision of midwives. Prenatal and obstetric care is afforded all classes in the population, largely through maternity benefits under National Health Insurance Acts. The central government has recognized also the importance of granting subsidies for maternity hospitals and prenatal clinics and of compensating local physicians when called in by the midwife. In England there are about 55,000 licensed midwives; but only approximately 14,000 are actively practising. This creates a difficult problem in training and supervision and is economically wasteful.

Grants-in-aid from the central government for local maternity and child health work have done much to stimulate better facilities throughout England. These grants originally were made on the "50—50" basis but in 1929 were changed to "block grants" on the basis of local "need" rather than expenditures. There are at present in England 1,300 prenatal centers, 2,800 infant welfare centers, and about 5,000 health visitors and district nurses.

We still have much to learn from Europe in the way of social insurance, especially in its bearing upon governmental subsidies for maternity benefits, child care, tuberculosis, and venereal disease control. While there has been criticism in England concerning certain details of the health insurance scheme, there is no evidence that either the medical profession or the public cares to abandon it. On the contrary, the expressions of opinion which were heard on every hand were in favor of strengthening and extending it.

In England at present there is a great deal of discussion concerning public housing. The relationship between housing and public health is clearly recognized, and definite steps have been taken by the government to wipe out slum areas and to stimulate the building of sanitary houses for the wage earning classes.

In 1933–1934 over 2,250 slum areas, covering 37,000 houses with 172,000 people, have been condemned. The tendency in England, as in Germany, is toward the construction of small houses on the outskirts of the cities. In England these are going up at the rate of 300,000 a year, over half of which are designed for lower paid wage earners.

France—The French have been pioneers in many phases of child welfare. Her physicians and statesmen have contributed substantially to the advancement of maternal and child hygiene; for example, the organization of crèches (day nurseries), consultations for nurslings (precursors of infant welfare centers), laws for the protection of young children (Loi Roussel), medical inspection of school children, and placing of tuberculous children in country homes (Oeuvre Grancher). Experimental research and practical application in immunization against rabies, diphtheria, and tuberculosis are noteworthy.

The French also have organized sev-

eral national associations for the protection of mothers and children and have sponsored a number of brilliant conferences on child welfare and preventive pediatrics. A new publication devoted to child welfare, *Revue Medico-Sociale de L'Enfance*, was initiated in January, 1933.

Home care with public health nursing is a recent development. More interest is manifested in clinical medicine. In actual organization there has been a strong tendency to institutionalize. Elaborate programs are often laid out, and administration tends to become bureaucratic. A number of brilliant suggestions of the French have been taken up by other nations and adapted successfully to their needs.

We can take lessons from France in her provisions for illegitimate children and their mothers, and in the thoroughgoing manner in which provisions for tuberculous children, both from prophylactic and curative sides, have been carried out. While vaccination against tuberculosis has received a setback in Europe due to the unfortunate Lübeck affair, the French are convinced that BCG is a satisfactory and effective method of immunizing young children against tuberculosis. Over 300 doses of the vaccine were being sent out daily from the Pasteur Institute last summer. Fundamental research was being carried on by Armand-Delille on radiography in childhood tuberculosis, which he has since published in Atlas form. A great impetus to child welfare in France was given during and after the war by American pediatricians and other workers under the American Red Cross and the International Health Board of the Rockefeller Foundation.

Germany—In Germany maternal and child hygiene have been placed upon a scientific basis due largely to the investigations and influence of German pediatricians. Czerny, the greatest of German pediatricians, in his classical

little book, *Der Arzt als Erzieher des Kindes* (The Doctor as an Educator of the Child), indicates the influence which the pediatrician may have in this field of child welfare. A program for the development of local child welfare centers has been adopted throughout the country. Maternity and infant health centers are found in practically all the important cities.

In 1933 there were consultation centers for expectant mothers in 70 cities of more than 50,000 inhabitants; Berlin alone had 46 centers. Maternity benefits were granted in 85 cities last year; the period for which such aid is granted in most cities (63 per cent) is 10 weeks. There are in Germany 922 infant consultation centers, 83 of which are in Berlin. The total number of individual consultations during 1933 was 197,600.

The foundations of this work go back 25 or 30 years and some of its roots to the social insurance plan of Bismarck in 1882. The Kaiserin Augusta Victoria Haus, established at Charlottenburg in 1909, is the parent institution for the training of physicians and children's nurses in child hygiene. Its archives are the most complete in Germany. It has an unbroken history of productive activity of 25 years and is still the most influential institution for this work. Research is continuing, and publications of results appear regularly.

Point XXI of the Nazi program provides that

The state must see to raising the standards of health of the nation by protecting mothers and infants, prohibiting child labor, increasing bodily efficiency by obligatory gymnastics and sports laid down by law, and by extensive support of clubs engaged in bodily development of the young.

There is every evidence that the regime intends to strengthen and extend work for mothers and children. While there have been many changes in personnel in hospitals, clinics, institutes, and wel-

fare organizations in Germany, the structure of its maternity and child hygiene work appears to remain intact. Clinics and health centers are running as usual. Maternity benefits are continued, although on a reduced scale.

Italy—The Fascist State has reorganized completely its maternal and child health program. In December, 1925, it created a new organization, the Opera Nazionale per la Protezione della Maternità e dell'Infanzia (National Institution for the Protection of Motherhood and Infancy). Central headquarters were set up in Rome in 1929 to coordinate closely allied activities in the different ministries of the corporative state and to promote active local cooperation in welfare work for mothers and children through Provincial Federations and Committees of Patrons. The purpose of this institution follows the main lines of development of the Fascist State—a highly centralized, comprehensive, or "totalitarian," organization to bring about unity of methods and action among the diversity of forms of welfare work for mothers and children in Italy. Mussolini has taken a personal interest in this institution as it has to do with eugenics, increase of population, hygienic and social protection of the State.

In order to stamp this national welfare work on behalf of mothers and their little ones with a definite character of its own, the government not only issued regulations, which have been enacted into law, so exact and minute in all particulars as to be termed by the Council of State a complete treatise on the care of mothers and infants, but with significant intention it has devoted the entire revenue from a new tax to supply the necessary funds for the institution; i.e., the tax on bachelors.¹

The program of the institution provides for the collection of statistical data, the organization of a service for the inspection and supervision of institutions, grants-in-aid to institutions most in need of financial help, direct

assistance to mothers and children, antituberculosis prophylaxis, training of specialized staffs for child care, maternal and child health education, reforms of welfare service for foundlings. Maternity and child health centers have been opened in all parts of Italy. Provisions are made to send pre-tuberculous and convalescent children to seaside and mountain resorts.

While there is still a strong tendency to institutionalize and to give clinical treatments, the new institution recognizes the importance of preventive medicine and child care and the responsibility for attention to children in their own homes. There has been improvement of public health nursing since the war, as the result of the establishment of nursing schools on American models shortly after the close of the World War. The recent opening of the new Institute of Hygiene and Public Health in Rome should give added impetus to child welfare work in Italy.

Russia—No account of the provisions for maternal and child welfare in Europe would be complete without mention of the stupendous changes under way for the protection of motherhood and childhood in the Soviet Union. We note the upheaval in thought and action which the Communistic philosophy has wrought in the daily life of women in Russia. Lenin proudly stated,

We have literally razed to the ground all the foul laws regarding the inequality of women, the obstacles to divorce, the odious formalities connected with it, the refusal to recognize children born out of wedlock, and so on, those laws the survival of which are still often to be found in all civilized countries.²

Accordingly, marriage and divorce have been oversimplified, depending entirely upon declaration of purpose. "Illegitimacy" has disappeared both from the Code of Laws and from common parlance.

The rights of children no longer depend upon the form of marriage but

are inherent in blood relationship and in the duty of the state to protect every child and to provide for its education. Both parents are equally responsible for its maintenance, and in case of divorce, alimony can be obtained from the father for its support and education. The mother may declare the paternity of the child even before its birth. The state has taken over very largely the physical and mental care of the child through consultation centers for women and children in connection with obstetrical hospitals and crèches (day nurseries).

The number of cots in crèches in cities and towns increased from 56,921 in 1929 to 365,010 in 1932. A unique feature of the crèche in Russia is its establishment in state and collective farms, and the use of traveling field crèches during harvest seasons. The crèche is taken into the field and the nursing mother at work there can nurse the baby several times a day. The number of cots in permanent crèches on state and collective farms increased from 8,564 in 1929 to 347,617 in 1932, and in temporary crèches on collective farms from 251,400 in 1929 to 4,529,000 in 1932. This enormous expansion has entailed a great deal of readjustment and has made it difficult to secure enough trained workers.

Space forbids the description of extensive work for mothers and children which has been developed in Austria, Hungary, Jugoslavia, Czechoslovakia, and Poland under the inspiration and with the material help of the Health Organization of the League of Nations, American Friends Service Committee, American Red Cross, American Relief Administration, Commonwealth Fund, and International Health Division of the Rockefeller Foundation.

SUMMARY

Lessons we may learn from child health conditions in Europe:

1. The bold experimentation in certain phases of maternal and child welfare now proceeding on a nation-wide basis in many European countries challenges our interest and critical study.

2. An amazing fact in Europe today is the foresight and vigor with which governmental schemes for maternal and child health are being pursued. Whatever the form of government, a desperate struggle is on to preserve, strengthen, and extend essential services for the welfare of mothers and children.

3. The recognition that the first duty of the state is to protect its mothers and children and to provide for their welfare through some form of social insurance is one of the strong points in the European system.

4. In countries where maternity and child hygiene technics have been built upon sound scientific principles and tested over considerable periods they are being preserved with but few pattern changes, regardless of economic, social, or political upheavals.

5. The ability to stick to fundamentals and not become enamored of fads, fancies, and frills, which inevitably break down in times of stress, is a distinguishing feature of child health work in Europe.

6. The stability and continuity of the English system of public health commends itself, because it provides for full-time well trained health officers in every locality, whose position is uninfluenced by political or personal prejudices.

7. There is better control of midwifery in European countries than in America. Adequate facilities are afforded all classes of women for prenatal and obstetric service and for maternity benefits.

8. There is a clear recognition of the intimate relationship between housing and child welfare. Definite steps have been taken by governments abroad to wipe out slum areas and to stimulate the building of sanitary houses for the wage earning classes.

9. The development of health centers as community units of coöperative health work, of generalized public health nursing, and of popular health education as found in the United States has not reached the same high level in most European countries. In these technics the United States has contributed materially to health work abroad.

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The Nutritional Aspects of Milk Pasteurization*

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THE evidences of animal experiment do not show any differences between raw and pasteurized milks.

The actual changes in milk caused by pasteurization are an increase in insoluble calcium of about 6 per cent, a reduction of iodine content by 20 per cent, and considerable destruction of vitamin C. Certain animals have a higher need for calcium than do infants and it may be that raw milk would be better for them than pasteurized milk, but there is no evidence that this is true for children. There is no convincing evidence that raw milk, even if it were safe, is superior to pasteurized milk in infant feeding. Pasteurized milk is probably better since it is more easily digested. The growing practice by pediatricians of boiling milk or of feeding evaporated milk to infants, shows that it is certainly satisfactory. The idea of splitting hairs over slight assumed differences is absurd. We should allow a reasonable margin of safety over the minimum nutritive requirements in child feeding, and this is best accomplished by giving a liberal allowance of milk.

The heating of milk is so great a safety factor in preventing disease that there should no longer be any argument about the superiority of raw milk.

We have an immense amount of clin-

ical evidence gathered from many countries which shows that pasteurized milk has fulfilled the needs for feeding infants and children over many years, with no evidence of damage, provided the loss of vitamin C is made good. The opponents of pasteurized milk have conspicuously failed to make a case against it in favor of the raw product. The marked lessening of incidence of intestinal troubles and contagious diseases carried by raw milk through pasteurization makes it hard to understand how opposition can longer be justified.

It is well known that milk is deficient in iron and in ascorbic acid, and perhaps also in copper, although during pasteurization it probably becomes sufficiently enriched in this element. But we no longer judge a food on the basis of what it lacks. We stress the importance and significance for health of making proper combinations of foods so as to secure effective supplemental effects. No baby intelligently managed is now fed milk alone for any considerable period. It is given cod liver oil and fruit juices early, and supplementary foods as it grows. The problems of feeding normal infants are now satisfactorily solved.

The only recent reports of nutrition experiments which show inferiority of sterilized as compared with pasteurized and raw milk are those of E. C. V. Mattick, and J. Golding, in England, who observed that rats fed biscuit made

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of white flour and water, supplemented with milk, either raw or pasteurized, grew normally and reproduced normally, whereas those fed the same biscuit supplemented with sterilized milk failed in reproduction, and of the original rats many failed to reach maturity. Their results seem to differentiate markedly between pasteurized and sterilized milks in their nutritive properties, especially in respect to power to support reproduction.

I have never been much impressed by these experiments for they were not planned in a manner to yield information which could be applied to human experience with diet. It is one thing to demonstrate that a simple mixture of biscuit and sterilized milk is less effective nutritionally than the same mixture with raw milk, and another to translate the condemnation of pasteurized milk used in an entirely different manner in the human diet where it is supplemented with foods more effective as sources of nutriment than white bread biscuit. The fact is that even in these English experiments, pasteurized milk was not shown to have undergone any appreciable deterioration, even when tested in so restricted a manner. No effective supplementary foods were studied in combination with the sterilized milk.

The experience of numerous investigators, including the present writer, and covering many years of studies with animals, shows that pasteurized milk, milk powders and evaporated milks, are essentially the equivalents of raw milk in nutrition. The differences between them is not sufficient to warrant serious consideration. Furthermore, the experience of the pediatric profession with sterilized milk has abundantly demonstrated that excellent results can be secured in infant feeding when such milk is properly supplemented with a fruit juice and cod liver oil and the infant receives supplementary feeding

with appropriate additions as it advances in age. The safety factor afforded by sterilizing milk as a safeguard against infections is so great that there is no question about the wisdom of this system of feeding.

The Lanarkshire, Scotland, study of 10,000 children receiving three-quarters of a pint each daily—5,000 raw, grade A milk and 5,000 pasteurized milk—with 10,000 as controls, gave clear evidence of the beneficial effect of milk feeding on the rate of growth. There was no difference in the raw and pasteurized milks (*J.A.M.A.*, 96:1243, 1931).

Scheunert and Bischoff (*Biochem. Zeitschr.*, 219:186, 1930) studied the food value of raw and heated milk, and found no detectable change in food value. These experiments furnish cogent evidence that cooking (foods other than milk as well as milk) as ordinarily practised, does not interfere with its usual influence on cell metabolism or prevent its utilization for such characteristic demands as growth and reproduction.

In a letter from Lord Dawson of Penn, to the Editor of the *Lancet*, December 13, 1930 (*A.J.P.H.*, 21:389, 1931), he states that pasteurization of milk should be universally recognized.

The Scottish experiment reported here is commented upon by the Editor of the *JOURNAL* (*A.J.P.H.*, 19:415, 1919):

The campaign for the increased use of milk by children and adults is based on sound facts. We still need to push our efforts for clean milk, and we should draw distinction between pasture milk and stall-fed milk, which does not have the same values unless the stall-fed animals are specially dieted.

Fortunately we now have available an excellent study by Leslie C. Frank and others of the U. S. Public Health Service, which should finally silence the critics of pasteurized milk. These

investigators studied children fed raw and heated milk, supplementing the diets ordinarily received by American children in 39 cities and in 10 states. The children to the number of 3,700 were from 10 months to 6 years old. The report states:

The growth-promoting capacity of heated milk plus the supplementary diet received by the average American child of 10 months to 6 years is not measurably less than the growth-promoting capacity of raw milk plus the supplementary diet received by the average American child of 10 months to 6 years.

Analyzing their data they report that there were 32 cases of diphtheria among 1,875 children who received heated milk only, against 40 among the 1,762 children fed predominantly on raw milk, case rates of 17.1 and 22.7 per 1,000 respectively. For scarlet fever, the group fed heated milk showed 43 cases against 73 for the raw milk group, case rates of 23.0 and 41.4 per 1,000 respectively.

Intestinal disturbances reported, such as diarrhea, dysentery, flux, colitis, and summer complaint, amounted to 426 for the heated milk group against 491 for the raw milk group, case rates of 227.0 and 278.0 per 1,000 respectively. When diarrhea was excluded on the assumption that many mild cases were due to causes other than milk, the incidence of intestinal diseases amounted to 208 for the heated milk group against 395 for the raw milk group, case rates of 111.0 and 196.0 per 1,000 respectively. Fifty-nine cases of rickets were diagnosed in the heated milk group against 90 cases in the raw milk group, case rates of 31.5 as against 51.1 per 1,000. The results as they relate to rickets are accounted for by the observation that more of the heated milk-fed children were given cod liver oil than was the case of those fed raw milk. Of the

heated milk-fed children 41.6 per cent were given some cod liver oil as against 27.6 per cent of those fed raw milk. The average weight of the children in the two groups was 33.6 and 33.2 lb. respectively for those fed heated and raw milk. There were no significant differences in the heights of the children of the two groups, *i.e.*, 37.5 and 37.4 respectively. The report shows a significantly higher incidence of diphtheria, scarlet fever, and intestinal disturbances. The report does not consider tuberculosis, but there is strong evidence that this disease has a lower incidence in cities where almost all the milk is pasteurized.

Since the effect of pasteurization on the food value of milk is too slight to be apparent even in specially designed experiments, and is not apparent in observations on children living under ordinary American conditions, there is no valid argument which can be brought forward in support of the marketing of raw milk for the general population. It is granted that certified milk is as safe as any ordinary foods, but if the optimum amount of milk is to be consumed by the public the price must be made as low as is consistent with the maintenance of high quality. The only method of accomplishing this objective, which has the full approval of public health officials and bacteriologists, is pasteurization of the milk supply.

It seems strange indeed that, when we accept so generally the cooking of most of our foods, there should still remain in certain areas a serious objection to the milk heat treatment of milk involved in pasteurization. The menace of bovine tuberculosis to the health of children is so great that universal pasteurization would be imperative if only for the prevention of the spread of this disease alone among children.

Studies in Ventilation

I. Skin Temperature as Related to Atmospheric Temperature and Humidity

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IT was desired to secure data on the relation between skin temperature and atmospheric temperature and humidity under ordinary conditions in a steam heated office with window ventilation. In lieu therefore of good experimental control of the extraneous variables, it was necessary to secure a sufficient volume of data to have statistical value.

The skin temperature determinations were made upon three female subjects engaged in routine office activities. Three measurements, one on each cheek and one on the forehead, were made at approximately the same times each day, namely, at the beginning, middle, and toward the end of both morning and afternoon periods. During Period I, March 24 to May 2, 1933, windows were closed for the most part and the office was heated; while during Period II, May 3 to June 30, windows were generally open and there was little use of artificial heat. Wet and dry bulb temperatures and Kata thermometer readings were likewise recorded with each set of measurements of skin temperature.

METHOD OF SKIN TEMPERATURE DETERMINATION

The skin temperatures were measured by means of a thermocouple system designed upon the following considerations. In any metal system in contact with the skin and with the adjacent

cooler air there is a flow of heat and hence a temperature gradient. The equilibrium temperature at any point in the metal is therefore somewhat lower than the true temperature of the surface of the skin, and this deviation constitutes an error in the determination of skin temperature.

This principle and the extent of the error in a typical system is illustrated in the following experimental data. A piece of copper wire, diameter d , was bent to form a right angle, one side of which, the contact arm, 2 cm. in length, was held against the skin, the other, the lead-off arm, L , rising perpendicularly in the air. A junction of fine constantan wire, 0.1 mm., was soldered to the lower side of the contact arm, at its mid-point, so that it pressed upon the skin. A second junction was soldered on the arm L at varying distances, x , above the angle (Table A).

The differences in temperature between the two junctions under various conditions were found to be as shown in Table A.

Accepting these differences as a first approximation to the true error of an actual skin temperature measurement made at point x we note:

1. With a long (5 cm.) lead-off arm, the error increases inversely as the diameter of the wire (I-4, II-3, V-1).
2. The error increases with air movement (I, V).
3. The error increases with the distance from the skin (x) (I-IV).

TABLE A
TEMPERATURE DIFFERENCES BETWEEN JUNCTIONS
(Air Temperature 20° C.)

Wire Diam. mm. (d)	L cm.	x cm.	Air Movement (ft. per min.)		Exp. No.
			25	100	
1.45	5	2.0	0.75	1.50	I 1
		1.5	0.50	0.95	2
		1.0	0.50	0.55	3
		0.5	0.25	0.40	4
		0.15	—	0.25	5
1.0	5	2.0	2.0		II 1
		1.0	1.5		2
		0.5	1.0		3
		0.25	0.5		4
1.0	2.5	2.0	0.75		III 1
		1.0	0.65		2
		0.5	0.50		3
		0.25	0.40		4
1.0	1.0	0.5	0.50		IV 1
		0.25	<0.05		2
0.4	5.0	0.5	1.75		V 1
	3.0	0.5	1.50		2
	2.0	0.5	1.25		3
	1.0	0.5	0.50		4
	0.5	0.5	<0.05	1.0	5
	0.3	0.3	0.0	0.4	6
	0.2	0.2	0.0	0.1	7
	0.0*	0.0	0.0	0.0	8

L = total length of lead-off arm
x = distance, on L, between skin and second junction
* L replaced by 5 ft. silk covered copper wire, 0.07 mm. diameter

4. With constant distance from the skin, the error increases with the length of the lead-off wire (II-III, V).
5. With contact wire of 0.4 mm. diameter and 2 cm. long the error is negligible in still air with the outer junction at the end of the lead-off arm 5 mm. from the skin, and in air at 100 ft. velocity it is 0.1° at 2 mm. from the skin.
6. A lead-off system of silk-covered magnet wire (diameter 0.07 mm.) provides no appreciable cooling of the contact arm.

It remains to be shown to what extent the contact arm itself, at least half the surface of which is exposed to the air, departs from the skin temperature. A sheet of copper 1 cm. thick, placed over the skin, would pass

the normal heat loss with a temperature gradient of about 0.1° between its two sides. Its mean temperature, however, would be determined by the relative thermal conductivities of the skin-copper and the copper-air contacts.

The following experiment gives an indication of the true relation. Two contact pieces were prepared, each 2 cm. long with a constantan junction at its mid-point. They were connected by a fine insulated magnet wire. One piece was pressed onto a piece of filter paper coated with glue, and when dry the paper was trimmed to about twice the width of the wire. The paper in

turn was moistened with glue and coated with a layer of fine asbestos fibre. In this way the upper surface of the wire was partially insulated against the air. This wire was placed on the skin side by side with a similar bare wire. No temperature difference was noted in still air. In air at 100 ft. per minute the protected wire was about 0.05° cooler, during several trials at different spots. The solid insulating material paper, asbestos and glue, with its increased and rough surface was evidently a slightly better heat diffuser than the bare wire alone.

It is evident that a bare copper wire of 0.4 mm. diameter pressed against the skin will assume a temperature very close to the actual skin temperature, even in an air current of 100 ft. per minute, if there be no extension of the wire not in skin contact except a copper

lead-off 0.07 mm. in diameter. We have also noted that wire of this diameter, 0.4 mm. gives a constant reading as between a very light contact or a maximum pressure against the skin, whereas the readings of a heavier wire, 1.4 mm., vary with the pressure.

The results of these studies have been incorporated in a system which is shown in the accompanying sketch (B). The framework is of spring brass wire carrying between the two lower loops a piece of copper wire 0.4 mm. in diameter and about 1 cm. in length which is held to the frame and insulated from it by silk threads. This copper wire constitutes the contact or collecting system.

The junction itself is soldered to this collector at its mid-point and consists of a wire of constantan 0.1 mm. in diameter and one of silk-wrapped cop-

FIGURES A AND B

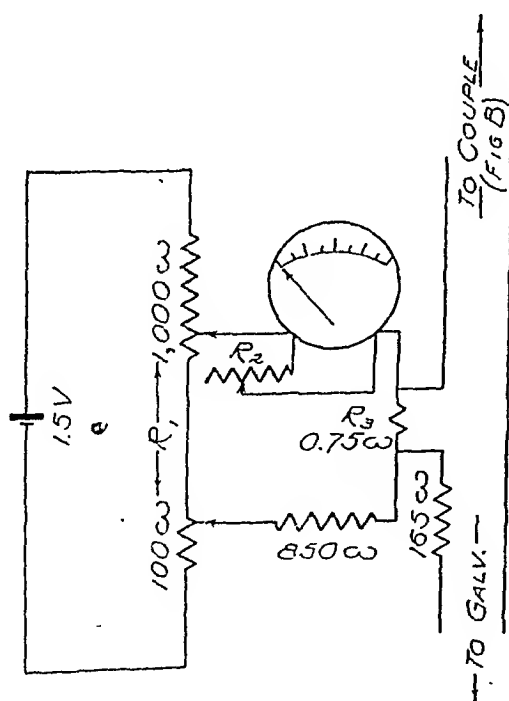
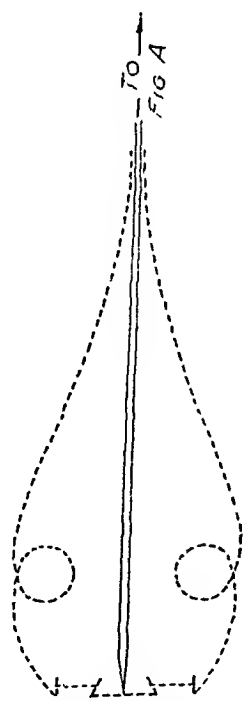
FIGURE A
WIRING DIAGRAMFIGURE B
COUPLE AND FRAME
—— COUPLE
----- FRAME

TABLE III
I PERIOD—ALL SUBJECTS
Skin Temperature and Humidity

<i>Relative Humidity Per Cent</i>	<i>Skin Temperature C.</i>										
	30.9	31.0-31.4	31.5-31.9	32.0-32.4	32.5-32.9	33.0-33.4	33.5-33.9	34.0-34.4	34.5-34.9	35.0-35.4	35.5-35.9
10-14			3	2	3	4	1				13
15-19		1	3	8	6	12	2	9	2	2	45
20-24			1	3	9	15	9	5	3		45
25-29	1	2	3	5	4	8	10				33
30-34				1	8	8	11				28
35-39				1	8	13	12	3			37
40-44			2	1	2	4					9
45-49		1		1	3	2	5	11	4		27
50-54					1	6	3	5			15
55-59						6	4	1			11
	—	—	—	—	—	—	—	—	—	—	—
	1	4	12	22	44	78	57	34	9	2	263

ohms internal resistance, critical damping resistance 200 ohms total, and was balanced to a zero reading by a device which we have modified slightly from sketches kindly shown us by Dr. Swartzchild of the Beth Israel Hospital, New York City, and which have proved of the greatest practical convenience.

In this apparatus, Figure A, a balancing E.M.F. is produced across the resistance R_3 . All variable thermo-electric effects are contained in the high potential circuits, the galvanometer circuit including merely the resistance R_3 ,

of 0.75 ohms, and a damping resistance of 165 ohms, both of manganin. The milli-ammeter has a range of 1.5 m.a. It is calibrated to read directly in degrees by establishing a known temperature difference between the hot junction in an oil bath and cold junction in its thermos bottle, and setting the resistances R_1 and R_2 so that the milli-ammeter reading corresponds to this difference on a scale of $1 \text{ m.a.} = 10^\circ$. Thereafter, R_2 remains fixed and the E.M.F. across R_3 is proportional to the current. Since the thermo-electric

TABLE IV
II PERIOD—ALL SUBJECTS
Air Temperature and Humidity

<i>Air Temperature F.</i>	<i>Relative Humidity (Per Cent)</i>											
	10-14	15-19	20-24	25-29	30-34	35-39	40-44	45-49	50-54	55-59	60-64	65-69
69			6	2	6	2	2	6				24
70-71			3	18	6	7	4			6		44
72-73			5	18	13	9	2	3	2	3		55
74-75		5	5	12	9	6	10	2	3	9	4	65
76-77		2		18	3		15	2	10	7		57
78-79		4			13	5			6	16	4	48
80-81				2		3	7		3	2	2	21
82-83					5			4			2	11
84-85								2		8	2	14
86-87								7		8	4	21
88-89								6	4	2		12
90-91									3	4		7
	—	—	—	—	—	—	—	—	—	—	—	—
	11	19	70	55	32	40	32	31	65	18	6	379

TABLE V
II PERIOD—ALL SUBJECTS
Skin Temperature and Humidity

Relative Humidity Per Cent	Skin Temperature C.											
	31.0- 31.4	31.5- 31.9	32.0- 32.4	32.5- 32.9	33.0- 33.4	33.5- 33.9	34.0- 34.4	34.5- 34.9	35.0- 35.4	35.5- 35.9	36.0- 36.4	
15-19						2	4	5				11
20-24						11	2	1				19
25-29		1	3	4	14	17	16	9	6			70
30-34			3	4	3	9	20	10	4	2		55
35-39	5	2	2	3	2	3	6	8	1			32
40-44					9	9	12	9	1			40
45-49			2	4	1	4	5	5	6	5		32
50-54				1	3	5	9	10	1	2		31
55-59				7	5	8	11	11	12	9	2	65
60-64					2	2	1	3	7	3		18
65-69								2	2	2		6
	5	3	11	24	42	70	86	73	40	23	2	379

E.M.F. is proportional to the temperature difference, the milli-ammeter calibration should hold over its range. This was actually found to be the case in several thorough calibrations over the range of the instrument. The control resistance R_1 consists of two potentiometers of 1,000 and 100 ohms respectively, giving a coarse and a fine control of the current.

Equilibrium was reached in about 10 seconds after application to the skin, and readings were generally completed after 20 seconds, temperature being recorded to the nearest 0.1° C.

THE DATA

The detailed protocols are voluminous in their original form but can be satisfactorily summarized, as they were for our formal analysis, in the form of three classified correlation tables for each period, which are here presented, Tables I-VI. Skin temperatures, read to 0.1° C., were grouped in 0.5° classes, air temperatures, to 1° F. were grouped in 2° classes, and relative humidities, to 1 per cent were grouped in 5 per cent classes. Tables of this sort were prepared for each of the three

individual subjects as well as for the group. The various characteristics of the distributions and their correlation coefficients are summarized in Tables VII and VIII, in which subscripts s , h , and t refer to the skin temperature, relative humidity and air temperature respectively, the former being expressed in C. degrees, the humidity in per cent of saturation, and the air temperature in F. degrees. M , with appropriate subscript, refers to the mean values, σ to the standard deviations from the mean, $r_{s,t,h}$ to the partial correlation coefficient between skin and air temperature freed from the effect of humidity, $r_{s,h,t}$ to the partial correlation coefficient between skin and humidity freed from the effect of temperature and the b 's to the corresponding partial coefficients of regression in the final regression equation.

Some individual differences will be noted as would be expected. In the essential details however the values for each period are sufficiently alike to justify treating the combined data as homogeneous and deriving the corresponding analytical equations from them. The standard deviations of the

TABLE VI
II PERIOD—ALL SUBJECTS
Skin Temperature and Air Temperature

<i>Air Temperature F.</i>	<i>Skin Temperature C.</i>											
	31.0- 31.4	31.5- 31.9	32.0- 32.4	32.5- 32.9	33.0- 33.4	33.5- 33.9	34.0- 34.4	34.5- 34.9	35.0- 35.4	35.5- 35.9	36.0- 36.4	
69	2		4	8	4	6						24
70-71	3		4	8	13	11	4	1				44
72-73		2	1	5	9	24	11	3				55
74-75		1	2	3	14	12	22	11				65
76-77					1	9	24	14	8	1		57
78-79					1	5	18	18	3	3		48
80-81						2	3	12	4			21
82-83							1	4	4	2		11
84-85						1	1	2	6	4		14
86-87							1	4	10	4	2	21
88-89							1	1	3	7		12
90-91								3	2	2		7
	5	3	11	24	42	70	86	73	40	23	2	379

correlation and regression coefficients given are tests of the validity of the correlations instead of the usual tests of the numerical accuracy; that is, they are computed upon the assumption of zero correlations. In making comparisons in the text the more usual form of the standard deviations are employed.

DISCUSSION

The coefficients of the temperature terms 0.17 and 0.14 respectively with standard deviations of 0.017 and 0.007 respectively, have a difference 0.03 ± 0.02 . We may safely consolidate these two into a single coefficient with a weighted mean value of 0.15. Within the range of these experiments, of ordinary indoor office conditions during the winter, spring, and early summer, the skin temperature of the face varied with the room temperature at a rate of about 0.15° C. per degree F. or 0.27° C. per degree centigrade. Since the difference between skin and air temperature represents the gradient through which the sensible heat component of the total heat loss must pass, and likewise measures approximately the radiation

gradient, this result indicates a decrease in the heat loss by conduction, convection and radiation, and a corresponding increase in the latent heat of evaporation at a rate which in the mean range tends to shift about 3 per cent of the convective loss over to evaporative loss for a change in air temperature of 1° F.

This result is in harmony with the data of Benedict and Root (1926) showing a progressive change in insensible heat loss with changing metabolism and consequent higher skin temperature. We compute approximately from the earlier work of Benedict and Carpenter (1910) that a change in metabolism which would raise the skin temperature 0.15° C. shifts about 1 per cent of the convective loss to latent heat loss. Our results indicate a decidedly greater transfer of the cooling burden to evaporation when the skin temperature is forced upward by increasing air temperature than is the case with increasing metabolism. We note with interest also that if our equation be projected to a room temperature of 37° C., the skin temperature becomes 37° , and the shift to latent heat loss is complete.

TABLE VII

PERIOD I

Summary

	Subject				S.D. (all)
	A	B	C	All	
N	94	93	76	263	
M_s	33.1	33.3	33.2	33.2	
M_t	72.4	72.3	72.1	72.3	
M_h	31	31	31	31	
σ_s	0.73	0.77	0.81	0.78	
σ_t	2.38	2.38	2.34	2.36	
σ_h	12.6	12.4	12.5	12.5	
r_{st}	0.48	0.61	0.56	0.53	
r_{sh}	0.18	0.21	0.32	0.22	
r_{th}	0.13	0.15	0.17	0.15	
r_{sth}	0.47	0.60	0.55	0.52	0.06
r_{eth}	0.14	0.15	0.28	0.17	0.06
b_{sth}	0.14	0.19	0.18	0.17	0.02
b_{eth}	0.006	0.003	0.014	0.01	0.004

$$S = 33.6 + .17(T - 74) + .01(H - 36)$$

Because they touch upon a subject which has been discussed from various angles, theoretical and experimental, and with somewhat varying data and conclusions, the coefficients of the humidity terms are of considerable interest. It is often stated as an accepted fact that evaporation, and the conse-

quent cooling of the body, is lessened with increasing atmospheric humidities. It is true that evaporation from a surface continuously moist, *i.e.*, a free water surface, is a variable quantity depending primarily upon the temperature, relative humidity, and movement of the atmosphere. On the other hand,

TABLE VIII

PERIOD II

Summary

	Subject				S.D. (all)
	A	B	C	All	
N	157	147	75	379	
M_s	34.1	34.2	34.0	34.1	
M_t	76.9	76.8	75.2	76.5	
M_h	41	42	37	41	
σ_s	0.94	0.92	0.97	0.94	
σ_t	5.6	5.7	4.2	5.5	
σ_h	13.3	13.1	12.5	13.1	
r_{st}	0.75	0.75	0.70	0.74	
r_{sh}	0.32	0.36	0.09	0.29	
r_{th}	0.53	0.55	0.28	0.51	
r_{sth}	0.73	0.71	0.70	0.72	.05
r_{eth}	-0.14	-0.10	-0.15	-0.14	.05
b_{sth}	0.14	0.13	0.17	0.14	.01
b_{eth}	-0.003	-0.006	-0.009	-0.003	.003

$$S = 33.8 + .14(T - 74) - .01(H - 36)$$

if the amount of moisture is limited and controlled by agencies independent of any specified atmospheric property, such as humidity, then the evaporation, and the resultant cooling, are similarly independent.

An example of the first sort is the lining tissue of the respiratory tract; especially the lungs. It will be of interest to determine roughly the influence of variations in atmospheric humidity upon this value. We may take the following hypothetical case.

Lung ventilation	8 liters per minute
Room temperature	20°
Expired air	Saturated at 34° C.

The moisture required to saturate the inspired air, if it be dry, is 38 mg. per liter or 304 mg. per minute. This represents a latent heat of evaporation at 34° of 10.2 Cal. per hour. But if the air be saturated at 20° it will take up 168 mg. per min., equivalent to 5.7 Cal. per hr. The hourly loss of heat by evaporation from the lungs varies therefore at a rate of about 0.045 Cal. for each change of 1 per cent in relative humidity. For a metabolism of 75 Cal. per hour the variation with humidity may therefore be placed at about 0.06 per cent of the total.

If the difference between skin temperature and air temperature represents the gradient through which about 75 per cent of the total heat is passing, a change of 0.06 per cent of the total value would produce a corresponding relative change in the gradient.

The mean skin-air gradient in our series is 10.8° C. Changing this gradient in the ratio of 75 to 75.06 would result in a change of .0086 as against the value of $.01 \pm .004$. In short, the effect of humidity indicated in the formula is readily ascribable to the change in evaporation from the lungs.

Evaporation from the skin is limited

to the output of water. The output is restricted either to a definite quantity, independent of the evaporating conditions of the air; or by having to diffuse through a membrane in which case the evaporation, while not from a free water surface, may nevertheless be similarly dependent upon the drying power of the air.

The testimony of physiologists on this point is varied. Various authorities (e.g. Hancock, Whitehouse and Haldane (1930)), believe that the so-called "insensible perspiration" is chiefly water diffusing by osmosis through the skin and is not the product of the sweat glands. Such diffusion might be accelerated by increased drying on the surface. It would surely cease if the surface became saturated. Vasti (1932) postulates a hydrate compound losing water to the air and absorbing it from the deeper layers.

On the other hand Benedict and Root (1926) show excellent experimental data in support of their thesis that the insensible loss is a definite linear function of the total metabolism over a wide range.

This subject has been satisfactorily discussed by Miura (1931). He states that the consensus of opinion among European physiologists is to the effect that the skin temperature and the sensations of comfort, especially throughout the moderate ranges of humidity found under indoor winter conditions, are essentially independent of the relative humidity. American physiologists on the other hand have tended to follow the suggestions of Houghton, Yaglou and McConnell (1923) of the research laboratories of the ASHVE whose well known chart of effective temperatures assigns a very definite place to relative humidity in the determination of comfort and of the sensation of warmth under indoor winter conditions in the home and office. Miura himself, on the basis of

a most carefully controlled series of experiments, concludes that a difference of 50 per cent in relative humidity results in a change in skin temperature of the face of subjects resting, normally clothed, of approximately 0.25° C. in the same direction, corresponding to a coefficient in the humidity term of our equation of $+0.005$. This is exactly one-half the value which we have found, is somewhat less than the value we estimate as the effect of evaporation from the lungs and, if Miura's results are about the same order of reliability as our own, both series cluster about the computed lung effect within their probable errors.

As a more critical test of the direct relation between skin temperature and atmospheric humidity uncomplicated by secondary reactions and variables we have made a brief series of tests as follows.

A small quantity of air was blown from a 4" funnel upon the forehead at so slight a velocity that it could not be detected unless the forehead was moist. The air was passed alternatively through a can containing calcium chloride or a similar can containing water. Relative humidity varied roughly from 25 per cent on the dry side to 75 per cent on the wet. Temperature was equalized after drying or wetting by passing through a worm in a water tank.

The subject was seated and two thermo-electric junctions, in series, were fastened over his forehead. These were then exposed alternately to the moist and the dry air. The air current alone produced a slight cooling as compared with still air conditions, but in no case among six experimental subjects was there anything more than a temporary drift of the skin temperature when the air supply was changed, and this returned within a minute or two to the initial point. The apparatus and galvanometer used gave readings sensitive to 0.025° .

From various investigations of the water loss, sensible and insensible, from the skin, and also from studies of skin temperature it appears that the important function of skin cooling by evaporation from the forehead and cheeks is, within normal ranges of both temperature and humidity, independent of the relative humidity of the air but that there is a minor secondary effect of relative humidity upon the forehead and cheek temperature due to the varying rate of evaporation from the respiratory tract.

The open air conditions which prevailed during a considerable portion of our second period were evidently largely responsible for masking a similar result in this series. These conditions differ markedly from those in Period I in that the humidity is rather highly correlated with the temperature ($R = 0.51$ as against 0.15 in Period I). The days of higher temperatures and higher humidities were largely days of open window ventilation with increased air movement and consequent relatively lower skin temperatures. In view of the small magnitude of the humidity coefficients in either series and their exact neutralization if the two series be combined it is easier to understand the fairly unanimous conclusion of European physiologists than it is to understand the common acceptance of the view that increased humidity makes for decreased cooling by evaporation.

For the purposes of comparison we consolidate our two equations, eliminating the humidity terms as of no practical significance, and transform air temperature to the centigrade scale, with 20° as standard. This gives

$$S = 32.8 + .27(T - 20)$$

We may now compare our values of the two constants with those from other sources (see next page).

Winslow and Greenburg (1932) recorded 26 sets of observations upon

SUMMARY OF CONSTANTS IN THE EQUATION $S = a + b(T - 20)$

	a		b		Temperature range
Present study, face.....	32.8	$\pm .03$ *	.27	$\pm .02$	20 — 27
Winslow and Greenburg					
Nude body.....	29.9	.6	.61	.14	8 — 29
Face of nude body.....	31.1		.41	.09	8 — 29
Bedford and Warner, face.....	34.9	.09	.35	.03	15 — 23
Ward, face.....	32.8	.11	.24	.01	15 — 30
Reichenbach and Haymann, forehead.....	31.8	.3	.31	.03	15 — 30
Vincent.....	—	—	.3		— . —

* The standard deviation at the mean temperature of the study, not necessarily at 20° to which the constant is referred.

selected spots of the nude body under a wide range of air conditions from which we compute the constants for the nude body. They also show the relation between mean temperatures of the various parts of the body, permitting separate computation for the forehead and cheeks. Bedford and Warner (1934) give the results of 415 observations over a considerable temperature range for bodies normally clothed. Reichenbach and Haymann's (1907) experiments upon 2 subjects have been recomputed in the range 16.5°–28.8°. They also quote a series by Vincent (1890). Ward (1930) has reported a study comparing 81 sets of measurements upon 4 subjects from which we have computed the constants for forehead plus 2 cheek values together. The indicated accuracy is fully justified in view of the careful technic employed.

THE EFFECTIVE TEMPERATURE SCALE

In view of these results and especially of the slight effect of humidity upon the skin temperature, it will be of interest to investigate some of the data from the point of view of the so-called effective temperature in the range in which we are interested. The effective temperature chart is so constructed that a dry bulb temperature of 70° at 50 per cent humidity designates the same effective temperature as a dry bulb of 75° at zero humidity. In this region, therefore, if skin temperature is to follow

effective temperature, the humidity coefficient must be one-tenth of the temperature coefficient in equations of the type of those we have used. This would allow about 50 per cent greater influence to humidity than is indicated in our first period equation, about twice as great an influence as we compute from the lung evaporation alone and about three times the value found by Miura (1931), a point which the latter noted. All these values however are well within the probable errors of data compiled from a short series of studies. In Winslow and Greenburg's (1932) series of 26 observations, for example, we compute a humidity coefficient of $\pm 0.02 \pm .04$. It is not surprising therefore that when any given series of skin temperature data are correlated with air temperature it makes little difference whether the humidity factor is included, as effective temperature, or excluded. We have computed such correlation coefficients using the data of our two periods separately and have also made a similar computation with the data of Winslow and Greenburg (1932), which they plot to show an excellent linear relation with effective temperature. Results by the two methods of computation are identical (p. 970).

SUMMARY AND CONCLUSIONS

Skin temperatures of the cheeks and forehead were determined upon 3 female subjects engaged in office work

CORRELATION COEFFICIENT r

Skin Temperature Against

Air Temperature Effective Temperature

S.D.

Present Study

I	.53	.51	$\pm .05$
II	.74	.72	.04
Winslow and Greenburg	.93	.92	.03

in a steam-heated, window ventilated office during the winter, spring, and early summer of 1933. Readings were made five or six times a day together with wet and dry bulb temperature reading in the office.

A statistical analysis of the data indicates:

1. A positive correlation between skin temperature and room humidity during the closed window seasons which is wholly ascribable to evaporation from the respiratory tract and which is so small as to be readily reversed by the slight effect of freer ventilation in the open window season.

2. A positive correlation with air temperature, indicating a rise in skin temperature of 0.14°C . per degree F. in room temperature (0.27°C . per degree centigrade) and a corresponding shift of 3 per cent of the total heat loss from radiation and convection to latent heat of evaporation. Similar coefficients, reported by or computed from the work of other investigators are shown for comparison.

3. The effective temperature scale, while admirably suited to comparisons in the higher temperature range of industrial conditions overestimates the relation of humidity to skin temperature in the range of ordinary office conditions in the winter.

Finally it remains to be pointed out that the sense of comfort as expressed in "comfort votes" and as felt by the individual, is largely determined, and can be objectively measured, by the skin temperature, possibly with the aid of some measure of the internal gradients as suggested by Bazett and McGlone (1927). The latter factor is clearly in evidence during rapid readjustment to changed conditions, but under equilibrium conditions we find Ward's (1930) data especially significant. The

comfort votes of 4 individuals were correlated with forehead temperature by coefficients (r) of from .80 to .96, or for the group .88.

In the further search for those evasive combinations of environmental characteristics, which are found to make for a sense of comfort, we believe that progress depends upon recognition of the fact that the body comes fairly quickly into quantitative thermal equilibrium with any environment that is not too extreme, but that large and significant shifts in the qualitative manner of heat loss are often brought about by apparently minor changes in the environment.

It follows therefore that the "cooling power" of the air as indicated by charts of "equivalent" conditions, or by any of the various instruments which integrate the effects of two or more air properties, is not a criterion of that qualitative distribution of the manner of cooling which alone, rather than the fairly constant total rate of cooling, appears to affect comfort.

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Storage Battery Plants, New York State, 1933

J. D. HACKETT

Prepared by Division of Industrial Hygiene, New York State Department of Labor, Albany, N. Y.

FOR the past several years an effort has been made to record the incidence of sickness due to lead poisoning on a *rate* basis. The object of this is to compare the rates of one factory with another, of one year with another, and the collective rate with that of others outside of state. The results for 1933 are now on record and, as will be seen by the table, there is a slight improvement over 1932.

There is a lead poisoning frequency rate of 9.25 as compared with 10.56, and a severity rate of 0.52 as compared with 0.58 for 1932. These figures, representing average practice, divide the factories of the state into two classes, those above and those below average. Hence, those needing to take additional preventive measures are indicated clearly.

The small plants have a distinctly high rate and it is certain that the figures indicate that preventive measures if adopted are not thoroughly effective.

The figures submitted indicate the minimum incidence of lead poisoning;

there may be unsuspected, unreported, or inconclusive cases, since the facts are obtained by correspondence and not by an independent investigator. For instance, in one case a claim is made for death due to lead poisoning on behalf of a deceased worker and this is denied by the employer. The case, being still in dispute, no figures appear. This indicates a limitation in the use of severity rates applied to occupational poisons, since the time lost may not be included in the period in which it occurs. But a subsequent correction is possible.

Although New York State as a whole shows an improvement, its figures compare very unfavorably with those of lead battery manufacturers outside the state. Certain plants outside the state, working more than twice the time, have one-third of the hours lost and a considerably lower relative frequency and severity rate. These figures indicate a high standard of hygiene practice and the need for more vigorous measures of prevention against lead poisoning in the various plants of New York State.

LEAD POISONING—STORAGE BATTERY FACTORIES

	<i>New York</i>		<i>Outside the State</i>
	1932	1933	1933
Total man hours worked	852,950	1,188,281	2,579,672
Total hours lost due to lead poisoning	4,936	5,647	1,864
Total number of cases		11	5
Frequency rate	10.56	9.25	1.94
Severity rate	0.58	0.52	0.09

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DENTAL CARIES¹

SOME of the most common ills to which man is heir are the least understood and the most refractory to control. The outstanding instances are the common cold and dental caries. In spite of the fact that large sums of money have been spent on research, and that capable clinicians, laboratory workers, and dietitians have been studying dental caries for years, it must be said that we are far from knowing its cause, and this means that we do not know the prevention. In spite of tooth brush drills, lectures on cleanliness, and cocksure statements that a clean tooth never decays, caries still afflicts the great majority of people.

While no one would advocate deliberately putting children on deficiency diets with the object of producing caries, we have in the various strata of our society many thousands of cases in which diets are deficient and which have furnished some evidence, though there is no record of just what many of these people have eaten or for how long. The majority of experiments have been carried out on dogs and rats, neither of which have teeth comparable in shape or arrangement to those of man. It is also evident that many of those writing on the subject have had inadequate knowledge as well as poor laboratory facilities, and many alleged experiments have not been continued for a sufficient length of time to be of value.

Some regard susceptibility to caries as being due to causes lying within the tooth itself, considering that the bacteria of the mouth and other local factors are of minor importance as compared with a well balanced diet. Some hold that balanced diets act in the prevention of caries by improving the general resistance of the body tissues. Others hold that the teeth are akin to bone in many respects and that prevention of caries may be attained by measures which insure the normal metabolism of calcium and phosphorus, one observer even assuming the existence of dental lymph circulation which concentrates, then carries, the acid-neutralizing properties of the blood to the surface of the enamel. Still others

believe that maintenance of the normal concentrations of phosphorus in the blood is the goal to be aimed at. Adequate supplies of vitamins A, C, and D have all been considered important in the development of teeth and the maintenance of their health. One of the most recent pieces of work indicates that vitamin D is the "most important single corrective factor."

Apart from actual injury by mechanical means, most students believe that tooth decay is brought about by action of acid formed by fermentation of carbohydrates on the enamel, leading to exposure of the underlying structures. This idea was advocated at least as far back as 1840, and there are many strong supporters of it today. At the School of Dentistry of the University of Michigan, Hadley and Bunting, after a prolonged series of studies running as high as $1\frac{1}{2}$ years, advocate this view and believe that the chief organism in bringing this about is the *Bacillus acidophilus*, which has the power of fermenting carbohydrates and can live in concentrations of acid of a pH as low as 3.2. In England, Sim Wallace is the chief advocate of carbohydrate fermentation as a cause of caries, though he has not so far identified any particular germ with the process.

The studies of Hadley and Bunting show that in persons with active tooth decay, the *B. acidophilus* is usually present, and that the numbers of these organisms in the saliva are directly related to the degree of susceptibility of the individual. They have studied groups which they classify as "immunes," "caries-inactive," "developing inactivity," "developing activity," and "constant activity," for periods lasting from 27 days to $1\frac{1}{2}$ years, and hold that there is a distinct relation between the number of *B. acidophilus* present per c.c. of saliva and the activity of caries. Occasionally positive results were obtained on salivas from "immunes" and "caries-inactive" persons, and negative results from susceptibles and those developing susceptibility. "The general bacteriological picture, however, is radically different, both qualitatively and quantitatively, for those representing the above noted extremes in caries activity." Their experience has satisfied them that in 85 per cent or more of the cases studied, the clinical findings are correlated very closely with the bacteriological picture. They have demonstrated that caries was produced in children on diets generally recognized as satisfactory for growth and well-being. Not only were careful records of the daily food intake kept, but analyses of the blood serum, studies of calcium and phosphorus retention, and medical observations all indicated that the metabolic processes were normal. Their appetites remained good, gains in height and weight and general behavior showed them to be normal.

There are a number of studies which indicate that the physical consistency of the foods is of greater importance in producing caries than the chemical composition. When rats were fed rice or corn coarsely ground, no caries resulted, but when mixed with the finer portions, caries resulted invariably. Bunting feels sure that the feeding of sweets, providing an extra caloric intake, is often the determining factor in producing caries in children on adequate diets. In an orphanage with inmates running from 6 to 18 years of age and in which the diet had been definitely deficient for 6 or 7 years, caries was inactive in 57.1 per cent of 49 children over a period of $2\frac{1}{2}$ to $4\frac{1}{2}$ years, and in 71.5 per cent of 109 children over a period of $1\frac{1}{2}$ years. The great majority had cavities on admission and 40 per cent were deficient in height, according to Woodbury standards. The explanation of the improved condition as regards caries is held by Bunting to be in the very low intake of sweetened food as well as the uniformity and regularity

in meals. Forty to 45 per cent of the calories received by these children was derived from starch, mostly cereals.

Bunting and his coworkers acknowledge freely that many observations do not lend themselves to ready explanation and doubt if there is any single principle which can be applied equally to all persons. Some are immune, and for these people it makes little difference what they eat. Possibly this immunity lies to some extent in the inability of the *B. acidophilus* to thrive in their bodies, and this is probably hereditary. There are others who are so susceptible that no diet can check the disease. For the great majority of people who are moderately susceptible, a great measure of protection is afforded by diets which are low in artificial sweets.

There are almost as many opinions on the causation and prevention of caries as there are workers on the subject.

REFERENCE

1. Koehn, Bunting and Hadley. A Review of Recent Studies of the Cause of Dental Caries. *J. Am. Diet. Assn.*, Mar., 1934, p. 445.

OPHTHALMIA NEONATORUM

PERHAPS the great majority of us feel that ophthalmia neonatorum has been conquered. From the scientific point of view, this is true, but from the practical point it is not. In spite of the studies which led to the prophylactic treatment by Credé in 1881, ophthalmia neonatorum is still too common. His method was the introduction of 2 per cent solution of silver nitrate into the conjunctival sac at birth. The fall in the incidence of the disease wherever this was done was striking. In Berlin it is said to have fallen from 9.14 per cent to 0.9 in one year in the maternity hospitals. In Munich the incidence fell from 10 per cent to 0.9. On April 1, 1914, in England and Wales, the disease became compulsorily notifiable, and following this, hospitalization was urged, the first special ward for such babies and their mothers having been instituted in Liverpool in 1907.

In 1918, the London County Council set apart St. Margaret's Hospital for a similar purpose. The Public Health Regulations in England define the disease as "a purulent discharge from the eyes of an infant, commencing within 21 days from the date of its birth." Results in other countries bear out those mentioned. Treatment was made compulsory in Denmark in 1900, it being required that 1.5 per cent solution of silver nitrate be instilled into the eyes of every child at birth. In that country the incidence of the disease dropped so that in 1925 they had only one case every second year.

Compulsory notification and treatment probably increases the number of alleged cases and makes statistics somewhat unreliable. On the other hand, the saving of eyes of affected children more than balances such mistakes. For example, in Edinburgh, in 1930, in a series of 173 cases the only accident was impairment of vision in one eye in one child, due to a delay of 10 days in sending the child to the hospital. In the same city during a 12 year period, 393 cases were reported and 202 were treated in hospitals, and in the 12 year period covered, impairment of vision has resulted only in the one case mentioned.

The best practice seems to begin with the mother in prenatal treatment. Accurate diagnosis and efficient treatment of every case of vaginal discharge must be carried out, and if the male parent is affected with gonorrhea, the treatment should extend to him also. The prophylaxis at birth consists of thorough cleansing

of the maternal organs and the instillation into the eyes of children of some antiseptic.

Curiously enough, there is controversy over what this antiseptic should be. Perhaps the majority of people are inclined to use silver nitrate, but there is high authority against this, since the 2 per cent solution of nitrate of silver may lead to "silver catarrh" and some opacity of the cornea. In the United States, de Schweinitz believes that it is not always advisable to use as strong a solution as 2 per cent, and holds that even the 1 per cent solution should be confined to suspected cases. It should be applied only by midwives who have had proper training or by doctors. Other silver preparations, notably the acetate of silver in 1 per cent solution, or some of the organic silvers, such as argyrol in 20 per cent solution, are recommended by some. Some authorities maintain that proper cleansing of the eyes at birth is more important than the silver salt, and advise that the eye should never be opened until the entire face has been thoroughly cleansed—especially the skin of the upper and lower eyelids. Other authorities are just as insistent in warning against the use of substitutes for nitrate of silver, and all prophylactics except silver nitrate are condemned.

It goes without saying that the preparations of silver should be reasonably fresh and in good condition. Practically all authorities agree in advising that the nitrate of silver be neutralized with normal salt solution to prevent its action from continuing for too long a time. In England there seems to be a strong opinion that the facilities for teaching medical students as well as midwives are deficient. The Council of British Ophthalmologists in 1928 pointed out that the instruction of midwives was poor and that most of the instruction was theoretical. In their opinion, practical experience should be provided during the course.

We cannot but conclude that ophthalmia neonatorum and the large toll of blindness which follows are comparatively easy to prevent. The principles were laid down more than 50 years ago, and have never been controverted. Indeed, experience everywhere has shown the soundness of Credé's original teaching, and no marked modification has been introduced which can be regarded as a distinct advance.

REPRINTS ON HIGH-TEMPERATURE, SHORT-TIME PASTEURIZATION AVAILABLE

AT the request of the Laboratory Methods Committee of the International Association of Milk Dealers, a review of scientific information on the subject of "High-Temperature, Short-Time Holding Pasteurization in the United States" was prepared in 1933 by Dr. M. W. Yale of the New York Agricultural Experiment Station, Geneva, New York. This work was published in the *Proceedings of the 26th Annual Convention of the International Association of Milk Dealers* for the Laboratory Section. It also appeared in the March and April numbers of *The*

Milk Plant Monthly for the year 1934.

Modern types of high-temperature, short-time pasteurizers in use in this country for the treatment of market milk supplies are illustrated and described. The paper deals mainly with studies of health authorities and others on cream layer volume, flavor, bacterial reduction, development of thermophilic bacteria, and tests with pathogenic bacteria.

Reprints of this work are available and may be secured upon application to the New York State Agricultural Experiment Station, Geneva, N. Y.

LETTER FROM GREAT BRITAIN

TWENTY-ONE YEARS' EXPERIENCE OF TUBERCULOSIS SCHEMES

The conferences of the National Association for the Prevention of Tuberculosis are held alternately in London and in some provincial center. This year provided an opportunity for the metropolis to welcome the conference, and since it was something of an occasion, being the year of the attainment of the majority by tuberculosis schemes in this country, no less, it was appropriate that London should be the meeting place. The attendance was smaller, perhaps, than the occasion demanded and had been expected, but what the meeting lacked in numbers it made up in distinction and enthusiasm. Being a meeting historically important, not unnaturally there was a great deal of "then and now" talk, and of congratulatory reference to progress made.

Prominent among those making addresses was Viscount Astor, who has long been interested in the tuberculosis problem, having been, in fact, chairman of a special committee set up in 1912 to consider it and to offer suggestions with regard to methods of dealing with it. Many of the elements later incorporated in the tuberculosis schemes of health authorities were, in fact, suggested by the Astor Committee. Generally, Lord Astor is recognized as one responsible for much of the really considerable progress made toward the solution of the problem and the reduction in the mortality from pulmonary tuberculosis from 1.08 per 1,000 in 1911 to 0.69 in 1933: and the fall in deaths from other forms of tuberculosis to 5,405 in 1933 from 13,888 in 1911.

On this occasion, Lord Astor was particularly concerned with the question of the relation of the milk supply to

tuberculosis, and the necessity for tuberculin testing of cows with tuberculin of a uniform standard. The subject set down for discussion by the conference was "The National Tuberculosis Scheme: The Experience of Twenty-one Years." More or less, the discussion centered round what were, when the scheme was established and no doubt still are, the two main elements—the dispensary and the residential institution. In regard to each a great deal that was said had reference to administrative rather than purely medical matters. Not only to the openers—Dr. Lissant Cox of Lancashire and Dr. Melville Dunlop of Edinburgh—but to subsequent speakers, the principal defect seemed to be a tendency for the dispensary and those associated with it to work in a watertight compartment. The need, therefore, was for closer coöperation between the dispensary and other activities of the health department in the schools and institutions, for example.

Speakers in the discussion on residential institutions sought to show that most astonishing and revolutionary changes had taken place. The old-fashioned sanatorium, it seems, has completely disappeared, replaced by a hospital very largely surgical in design, presided over by a physician who is less an authority on tuberculosis than a hospital director. The conference in general was a very pleasant and interesting one and, if it did no more, showed at any rate the extent of the progress made in the twenty-one years during which schemes have been in operation; how matters now stand, and the directions which effort in future should take.

PREVENTION OF CHILD TUBERCULOSIS

At the National Conference on

Maternity and Child Welfare, which was held at Birmingham some two or three weeks after the Tuberculosis Conference, among other matters tuberculosis again came up for review.

In a paper on the prevention of the disease in children under 5 years of age, Dr. Dixon, the tuberculosis officer of Birmingham, opened a discussion that interested the conference greatly. From figures submitted, which proved that some 20 per cent of 1,813 cases investigated gave a history of contact in the home with a known case of pulmonary tuberculosis, it seemed clear that preventive action of some sort was necessary. The lines suggested were the production of some degree of immunity, and secondly the introduction of measures that will result in breaking the child's contact with a known source of infection. In the latter connection reference to the need for coöperation between the infant and school child welfare workers and those engaged in tuberculosis work was made.

Segregation of infective cases was also praised as advantageous, though it is interesting to note that the voluntary was counted preferable to the rigorous and compulsory isolation of cases, since in many instances the latter might be a harsh procedure.

A note in this paper worth repeating has reference to the fact that in the colonies at Papworth and Preston Hall, no child born in the village has yet shown evidence of clinical tuberculosis, and no single case of tuberculous meningitis in a child has yet occurred. "Moreover," it is added, "the children, when old enough to work, enter the workshops in the colony and work in daily contact with tuberculous persons."

Among other subjects of importance discussed at this conference were the reduction of neonatal mortality and orthopedic work among preschool children, the contributors including Dr. G. F. McCleary, who, though he is

better known as an authority on matters connected with the operation of the national insurance acts, has made some notable contributions on the subject of infant welfare.

AMERICAN DELEGATES TO THE HEALTH CONGRESS

The Health Congress of the Royal Sanitary Institute, generally regarded and accepted as the one occasion during the year when workers in, and persons concerned with, public health and preventive medicine can meet and confer together, was held at Bristol from July 9 to 14. If it was no more, it was certainly no less brilliant as an affair than any of its predecessors. If anything it had more of an international aspect than usual, visitors from other countries and British dominions overseas attending in considerable numbers. Prominent among these were Professor Walter Brown, who, in responding to the toast of "The Guests" at the "overseas luncheon," one of the pleasantest of the functions held during the week, appeared to share the astonishment at being grouped with foreigners in my country that I have experienced at being similarly classed in his!

Other colleagues from the United States it was a great pleasure to meet and greet were Passed Assistant Surgeon R. B. Holt, representing the Government, and Dr. Jackson Davis, who, with Professor Brown, represented the Association and at the same time acted as delegates of the New York State Department of Health.

Thomas B. Appleget and Dr. G. K. Strode of the Rockefeller Foundation, the latter its representative in Europe though not included in the official list of delegates, spent several days at the Congress and were very welcome visitors. Dr. Holt and Dr. Strode both took part in discussions, and the former, in addition, made an attractive speech at the opening ceremony.

The programs of the various meetings were very heavy, but in spite of the exceptional warmth and fineness of the weather, the great bulk of the 1,500 persons present appeared ready to attend and to take part in discussions. The attendances at the numerous social functions were very large also, perhaps all the larger because the climatic conditions were so favorable. This was particularly the case with outdoor functions such as garden parties, several of which had been arranged by the authorities of the University of Bristol among other of the several very hospitable bodies and individuals in the city.

One of the most interesting hosts was the Society of Merchant Venturers, which dates back to the 14th century and claims Cabot as one of the earliest of its chairmen. Possibly for this reason the society is extremely exclusive, and invitations to such functions as the luncheon given on the occasion of the congress are greatly valued by the recipients.

STERILIZATION OF MENTAL DEFECTIVES

Of the subjects discussed at the sectional meetings and conferences, many naturally had what was practically a local appeal only, having reference to difficulties and details, administrative mainly, with which health workers in this country are faced.

In a number of places quite a considerable amount of attention was given to the subject of housing, with which, as I have already explained, strenuous efforts are now being made to deal. Just how serious these efforts are may

be judged from the fact that the Minister of Health himself (Sir E. Hilton Young) considered it worth while to attend the congress for the purpose of delivering an address.

In more than one section also the discussions had reference to the question of mental hygiene. This was particularly the case in the Preventive Medicine Section where a session jointly with the Conference of Medical Officers of Health was devoted to a consideration of the problem of the mental defective. In this I was particularly impressed by the number of references to such procedures as euthanasia and sterilization as remedies. Coming from specialists in the treatment of mental diseases, several of whom attended and spoke, I was interested in the criticisms made of the recommendations in favor of voluntary sterilization offered by the departmental committee set up by the Government to consider the question. Considerable doubts were expressed as to the likelihood of any effect whatever upon the problem being produced by the procedure. If it was to be adopted at all, the view seemed to be that it was preferable that it should be voluntary, the experience of Germany, where drastic measures had resulted in the concealment of cases of defect, being unfavorable to the adoption of anything resembling compulsion. Among contributors to this discussion were Dr. Holt and Dr. Strode, the joint presidents of the section and conference being two Honorary Fellows of the American Public Health Association, Professor W. W. Jameson and myself.

London CHARLES PORTER, M.D.

PUBLIC HEALTH EDUCATION*

"There are no dull subjects; there are only dull writers."

Mobilization for Human Needs—

The health agencies supported, at least in part, by community chests will be much concerned with the plans for the intensive mobilization period, Oct. 21 to Nov. 11, 1934.

Much national publicity is to be issued by Community Chests and Councils, Inc., 420 Lexington Ave., New York, N. Y.

Health workers may contribute to the success of the nation-wide effort by supplying ideas, statistics, and other factual material including case stories. Most useful will be anything showing needs or results, or progress in terms of results.

Send such material to Louise Franklin Bache at the above address. Miss Bache is the author of *Health Education in an American City*.

An Exhibit of Mail Campaigns—

The Direct Mail Advertising Association announces that it will build a new traveling display showing how major industries use direct mail. There will be a social service section, which would include health. Users of direct mail for money raising or otherwise, are invited to submit specimens to the Educational Committee, Elmer S. Lipsett, chairman, 89 Broad St., Boston, Mass.

Paintings Show Hospital Life—

Under the title, "Hospital Art Shown at World's Fair," the *Trained Nurse and Hospital Review* for July, 1934, describes a series of 40 paintings by Kay Bishop, which are now hanging in the Hall of Science. Six of the pictures are reproduced. Whatever is to be done with them when the fair closes, it seems probable that these paintings will serve a useful purpose for a long time to come, both in the original and for reproduction. (468-4th Ave., New York, N. Y. 35 cents.)

Scientific Information and Newspaper Readers—Austin H. Clark, biologist and member of the staff of Smithsonian Institute, has for several years directed press service for the American Association for the Advancement of Science. Out of this experience he tells scientific men some of the problems in adapting scientific material to newspaper readers. Of special interest to health workers is his statement that

Articles concerning the physical and mathematical sciences must be written more or less on a witchcraft basis.

Urbanization and the phenomenal engineering and mechanical advances of the past quarter-century have so isolated us from the fundamental factors of our natural environment that we are prone to regard ourselves as wholly free from the mental shackles of superstitions and the belief in the supernatural that characterize men and women

* Please address questions, samples of printed matter, criticism of anything which appears herein, etc., to Evart G. Routzahn, 130 East 22d St., New York, N. Y.

less fortunately situated—that is to say, savages and our own ancestors.

But, while continuing to flatter ourselves with this comfortable belief, let us constantly remember that the human mind has not changed, and that all the beliefs we deprecate in the so-called savages and try to forget in relation to our own forbears exist today in most newspaper readers—and also in us—in a more or less modified form.

Successful publicity for science is based first of all upon the recognition of people for what they are; it is futile to assume that we can make them over into what we would like them to be.

He also stresses the fact that the public is interested in personalities and emotions, while scientific men believe at least that they appreciate the world on the basis of determined facts. Every scientific article written for popular consumption, he says, must be tied to some personality. And “in addition to being tied to some personality it must have as a keynote—love, hate, gain, loss, mystery, or some other basic emotional concept.”—*Editor and Publisher*, Times Bldg., New York, N. Y. June 30, 1934. 10 cents.

Not Talking Down, but Talking With Readers—The *New York Daily News* has in its 15 years built an enormous circulation. In the discussion of its policies in *Editor and Publisher*, June 30, its general manager takes issue with a criticism that it is edited for 14-year-olds. The intelligent adult, he says,

... revels in a display of brawn and mastery. That is human nature. Perhaps the same man will come home from the prize fight and pick up Shakespeare and read it and enjoy it. It is our feeling that the 14-year-old mind, and even the 8-year-old mind, is a part of the mental equipment of the average human being.

He adds that the *News* is edited to meet the various requirements of the average person's mental equipment. He thinks that it is of greatest importance that its writers should be a part of the

crowd. They should feel as the masses feel and like the same things that the masses like. (Times Bldg., New York, N. Y. 10 cents.)

Some Approaches to Broadcasting—Before us are three series of weekly or twice a week radio talks sponsored by city and state health departments. They cover periods of about 6 months. Back of each of these three broadcasting programs was a conception of the task, or at least, a state of mind about it that is worth considering as you review your own recent programs or your plans for the coming year. The first series might be described as an “its your turn now” technic. Evidently the head of each bureau in the health department was assigned his or her period on the air, given the allotted number of words. From this point on, there is no evidence of any plan or supervision. Half of the talks seem quite unsuited to radio—prepared as though to be delivered in a classroom. The others are more or less interesting, but on widely varying intellectual levels. There was nothing in the series to attract or hold a steady group of listeners. Whoever was responsible for the series regarded his part in it as merely one of arranging dates and getting copies of the talks into circulation.

The second series was also passed around among bureau heads, and also other health specialists, but someone with a pretty definite idea as to what radio audiences would like must have consulted, revised, coached, titled, and otherwise kept the whole program on a level with the interests of everyday conduct the talks were intended to influence. Both titles and opening paragraphs suggest familiar experiences, or use familiar phrases.

The third is a one-man series and apparently the speaker was chosen because he could do this kind of thing

better than anyone else. The talks appear to be planned for a somewhat limited audience, made up of those who want to be better informed rather than those who are looking for advice for immediate use; but certainly the radio supplies such an audience. There is an appeal to the intelligence, but no strain on the capacity for sustained interest. Historical information and anecdotes are used to introduce talks on medical discoveries and the conquest of disease.

Telling the Public About Maternal Mortality — The obstetric advisory committee of the Children's Bureau urges that "there should be widespread education of the public as to the ing":

1. That the high maternal death rate is due largely to controllable causes.

2. That it is necessary for all women to have adequate supervision and medical care during pregnancy, labor, and the postpartum period, such supervision and care to begin early in pregnancy and to be continuous through the postpartum period—

a. In order to safeguard the health of both mother and child.

b. In order especially to control the infections, toxemias, and hemorrhages that this study and others have shown to be real menaces to life.

3. That there is danger of death or serious invalidism following abortions, spontaneous or induced.

4. That the community has a definite responsibility to provide adequate medical and nursing facilities for the care of women during pregnancy, labor, and the postpartum period. This predicates the proper organization of hospitals, outpatient services, and medical and nursing personnel, and applies to both home and hospital care. The community should know the standards for hospitals taking obstetric cases that have been drawn up by the American College of Surgeons.

5. That judicious selection of the hospital to be used for maternity care is of the greatest importance when hospitalization is planned.

6. That the better education of those caring for women during this period is essential and should have public support. This in-

cludes adequate obstetric training for medical students, postgraduate obstetric training for physicians in practice, to keep them abreast of modern developments, the training of nurses in good maternity care, and the training and supervision of midwives in communities where midwives still practise.

7. That it is important to make careful and intelligent selection of the attendant for maternal care.

Physicians should assume leadership in a number of directions, including:

1. Informing the public that the high mortality during pregnancy, delivery, and the postpartum period is due largely to controllable causes.

2. Warning the public as to the dangers occasioned by abortions, spontaneous or induced.

From Maternal Mortality in Fifteen States, a study of the Children's Bureau. Superintendent of Documents, Washington, D. C. 234 pp. 20 cents.

Getting a Thrill Out of Figures—There is no attitude of "take them or leave them" about the service statistics in the Palama Settlement's 1933 report. They are all told as though figures were exciting.

35,701 hours of public health nursing represent another phase of Palama's contribution to the community.

Think of 35,701 hours packed with highly skilled ministrations to the sick, persuasive health teaching to the well, supervision of the health of the children in 22 public schools and 14 kindergartens.

Think of 591 women carried through many months of pregnancy with health guidance under medical supervision in 154 prenatal conferences and with *no deaths from maternal causes*.

Think of 1,610 infants under 1 year of age and 1,534 between 1 and 6 years of age receiving, in 579 child health conferences with physicians and nurses, health guidance that a few years ago no amount of money could buy.

This is an exceptionally interesting and attractive report of work at a health center. Philip S. Platt, Director, Palama Settlement, Honolulu, Hawaii.

A 40-year-old Book Still Going Strong—"Publication today of the fifteenth edition of a work of non-fiction that has been read more widely by women than any other published in America prompts the First Reader to consider this unique phenomenon in the manner of the author":

What book has this remarkable distinction? It is Dr. L. Emmett Holt's *The Care and Feeding of Children*.

How do you account for that?

It has sold 800,000 copies, and every copy has been read by at least 5 mothers and discussed by 20. It is known as the "Baby Bible," and a whole generation has been brought up on it.

How did it get this extraordinary distinction?

Because Dr. Holt put aside the pretensions of the medical priesthood and in the simplest terms discussed the care of children so that every mother could understand it. Besides, he wrote advice that was meant to keep the child well. He did not alarm the mother with a parade of symptoms and a list of preposterous precautions. He did not tell anecdotes of all the terrible cases he has observed as a physician. He took for granted that the young mother wanted to know how to feed, clothe and train her infant and keep him healthy and gaining. And because he had a fund of simple words he put it into the English language, forgetting Latin, Greek, and the passwords of the doctors.—Harry Hansen in *New York World-Telegram*, July 19, 1934.

Dollars or Children?—The puzzling combination of falling death rates and a widespread hunger is the theme of an article by Paul De Kruif called "Dollars or Children" in *Ladies' Home Journal* for August, 1934. The author refuses to accept "the blessings of poverty" point of view in the face of mortality statistics which seem to give validity to that phrase. "I have just begun to understand how the science, the brains, the wit, the devotion of a miserably paid small army of men and women can guard a fundamentally teachable mass of humanity from the deadliness of this needless poverty. It is a gleam of hope in a world gone

hay-wire, this spread of knowledge down to the lowest depths, trickling an economic system that puts dollars ahead of the lives of children." He tells the story of Detroit's public health education work and coöperation of physicians declaring that it is only because brains and devotion with next to no money are still there, that sickness is prevented.

I wonder if we hadn't better urge our searchers to turn from their marvelous death-preventing diphtheria toxoids, to look for a real cheap vaccine against the spiritual miasma that's beginning to follow want amidst plenty? There was a very crabbed old Scotsman, Thomas Carlyle, who understood it when he said: "It is not to die, or even die of hunger, that makes a man wretched; many men have died; all men must die—the last exit of us all is in a fiery chariot of pain. But it is to live miserable we know not why; to work sore and yet gain nothing; to be heart-worn, weary, yet isolated . . . girt in with a cold universal laissez faire."

I'm beginning to look a little into the happiness of these children in my state of Michigan. Happiness is built fundamentally on vitality. And if the children's vitality is only maintained—why should we be so proud that in spite of needless want we've simply maintained it?

Environment can lift the vitality and happiness of children. Except for those queer dollars, environment is here as we choose to make it . . .

This article, by the author of *The Microbe Hunters*, is a contribution to public understanding and appreciation of health work for which both health officers and privately supported health agencies may well be grateful.

A Review of a Two-year Radio Program—Mimeographed copies of the radio talks on personal and public health presented by the Jefferson County Board of Health, Birmingham, Ala., during the last two years have been bound together in two convenient reference volumes under the title, "Health by Radio." Since a regular program of this kind reaches a fairly stable nucleus of listeners, it may be considered as a whole as a teaching

program. From this standpoint, a good feature is the repetition from time to time of the same subject under different titles, and as part of more inclusive talks. For example, tuberculosis is the theme of at least four separate broadcasts in Volume II, and is brought up again and again in connection with broader topics.

A broadcast on "Medical Words and Their Meaning," seems to us a topic worth repeating more than once. Too many words were defined in a single talk. This important factor in broadcasting, of getting technical terms understood, might well take account of the difficulty in grasping unfamiliar words when they are heard and not seen. Words like bacilli, antitoxic, micro-organism, miasmata, were used in the process of defining other words, thus piling up the listener's confusion rather than helping him out of it. The advertiser repeats the name of the product over and over again and spells it more than once.

Perhaps the announcer made up for the rapidity with which words and ideas were passed over by urging people to send for the talk. A reminder that you could get a copy of the talk could be given in the course of the talk as well as at the beginning and the end.

The occasional use of provocative titles in addition to the simple descriptive titles like "Nerves," "Sleep," and "Summer Colds," is a good feature. "The Disgrace of Dying" is a novel way of arousing a sense of responsibility for both personal and public health. The blame for practically all deaths but those of old age is put squarely upon causes for which either individuals or the community are to blame.

But everyone who dies from any other complaint than old age, dies prematurely from an "unnatural" cause: and in the vast majority of cases, a premature death is a preventable death: hence, a disgraceful, because an unnecessary, death. The average

death is a reflection on the intelligence of somebody; either the victim, his family, or of the larger family, which is the community or society in which he lived. You may not believe this, so permit me to elaborate somewhat.

Under the popular "Believe It Or Not" challenge, the listeners are invited to test their own beliefs about certain widely held superstitions, fads, or half truths.

Some other good topics which approached public health from the point at which listener interest is greatest, are "How's Your Rheumatism?" "Wooden Indians" (about how ideas and knowledge have changed), and "Little Bugs and Big Bugs."

For the Three-year-old in England—Sir George Newman, in his *Annual Report for 1932*, as Chief Medical Officer of the Board of Education, urges

... local authorities throughout the country now to concentrate on the preschool child as they concentrated originally on the problem of infant mortality. He points out that the work of the school medical service is gravely prejudiced by the continued influx, year after year, of large numbers of young children suffering from impaired health and physique. Further, he writes: "The exceptional saving of infant life since 1910 has added to the population thousands of young children who, under less favorable circumstances, would not have survived. If, in addition to our continued neglect of the preschool child, we are also saving many physically and mentally enfeebled children, it is obvious that we must anticipate a heavy burden of defective children coming into the schools at 5 years of age."

In Durham County "an interesting and novel form of propaganda is being tried."

During the health week campaign in the county last year a number of the child welfare centers celebrated Health Days, and made each Health Day the occasion of a "Three-year-old Welcome Party."

A series of these parties is still in progress in the county. A card is sent to the mother of every three-year-old in the area served by the center, inviting her to the party, and

suggesting that as she will probably like to know her child's weight, and as there will be a crowd on the day of the party, opportunity is afforded for the weighing of children on a day preceding the event. A great many parents have risen to the occasion, taking the trouble to have their three-year-olds weighed on the day before the party.

It is much easier to get an idea of what the three-year-old population looks like if the children "process" alone, but, as the organizers of the parties found, it is by no means easy to get, say, a hundred lively and cheerful three-year-olds to form a procession, and it is surprising how soon a carefully arranged procession turns into a gay riot.

After the procession the mothers listen to an address, given by the medical officer of the welfare center, on the health and care of the three-year-old.

—*Mother and Child*, 5, Tavistock Square, London, W.C.1. Jan., 1934. 9d. a copy.

The Fifth New York State Health Poster Contest—This year the subject of the annual health poster contest in New York State was "Edible greens at little or no cost." The winning poster has as its slogan "Eat More Greens—They Are Nature's Best Tonic." A scholarship prize and three cash prizes went to high school art students. Further information about the posters can be obtained from the State Committee on Tuberculosis and Health, 105 East 22d St., New York, N. Y.

Health Education in the Journal—In *American Journal of Public Health*, July, 1934:

"Outline of Institute on Maternal Care by Victorian Order of Nurses for Canada."

"A New Deal in Health Education," by Bertrand Brown. The "basic task"; an institute of health education.

Eleven and One-half Per Cent—

The analysis of registration at the 1933, Indianapolis, meeting of the A.P.H.A. revealed that 53 out of the 456 members of the Public Health Education

Section were registered. This 11½ per cent was exceeded by 8 sections. One section only had a smaller percentage registered. Details in July, 1934, *Journal*, p. 754.

Is There Need for Nutrition Propaganda?—The National Baby Week Council, at a meeting in London, Nov. 15, 1933, discussed nutrition as a possible topic to be emphasized during the coming year. Dr. Eric Pritchard said:

The need for a spread of knowledge on matters connected with food and nutrition exists in all ranks of society. The newer knowledge of nutrition is beginning to invade all classes, but it advances slowly, and we should like to see the pace accelerated. Very complete knowledge does exist at the present time on these subjects, but it remains in the hands of the few, and requires far wider dissemination. This newer knowledge of nutrition includes certain general principles, the observance of which makes all the difference between good and bad health. The application of this knowledge does not involve, as a rule, any additional expenditure, but it does require more intelligence in the expenditure of that proportion of the income which is allocated to the purpose of buying food.

—*Mother and Child*, 5, Tavistock Square, London, W.C.1. Dec., 1933. 9d. a copy.

Lessons from the Past—Local and general history offer much material for attracting attention and emphasizing progress and how it may continue.

An extended article by W. R. Riddell illustrates anew the fascinating material to be found in the history of medicine and the health superstitions of the past—material which may lead readers into more prosaic information usable in the present day. In *Canadian Health*, 105 Bond St., Toronto, Ont., March, 1934. 15 cents.

"Health In Boston a Century Ago" is based on a study of vital statistics, suggesting the usability of similar Studies of other cities. *Statistical*

Bulletin, Metropolitan Life Insurance Co., New York, N. Y., April, 1934. Free.

Under "Then and Now," *Michigan Public Health*, Lansing (Oct., 1933), says:

The modern method of teaching health to children by putting it into their daily living rather than merely into their textbooks is a drastic change from the old way. In the library of the Michigan Department of Health is a "Catechism of Hygiene" published in 1893 and made up of 396 questions and answers. The preface suggests that these be "committed to memory as are the A B C's. They contain the essence of the whole science of hygiene, and, when they have been memorized, the pupil will be ready to take up the more advanced books on the subject and read them with understanding."

For the encouragement of those who may be inclined to question the newer method, we quote from the Catechism:

"Q. 68. What is the most unhealthful occupation?

"A. Hotel waiters are the most unhealthy of all men.

"Q. 69. Why are hotel waiters so unhealthy?

"A. Because hotel waiters are all the time eating the food and drinking the liquor that the guests leave at the table; they thus ruin their stomachs and destroy their health."

Material for Panel Discussion—

A page and a half of statements and questions were offered to panel and audience at a social hygiene session of the Annual Conference of State and Local Tuberculosis and Public Health Committees, State Charities Aid Assn., New York.

Horace H. Hughes, reporting the panel, says:

The participants in the panel discussion were sent mimeographed copies of these and other questions to be discussed several days before the Convention. They were requested to give their frank opinion. Several hours before the panel was held the chairman discussed informally with the various participants the general questions to be brought out. Copies of the questions were given to the audience.

Dr. Parran made the discussion as informal as possible. The speakers were seated on a

platform about one foot high in a semi-circle, facing the audience. It seemed to many observers that much more frank discussion of problems of social hygiene were accomplished by this method of presentation because there were no set speeches and each participant spoke as if he were conversing with a group of friends.

Of course, we found several difficulties which will have to be overcome if in the future this type of meeting is to be completely successful. The most important is the problem of maintaining the informality and yet having the speakers talk loud enough so that they can be heard in the rear of the hall. I think that the success of any panel discussion depends largely upon the chairman. He must maintain a fast tempo in the meeting and be thoroughly acquainted with the subject. We, fortunately, had an excellent chairman in Dr. Parran.

Copies of the discussion outline will be supplied by S.C.A.A., 105 East 22d St., New York, N. Y. Enclose return postage.

Health Education as It Is—The need for health education of adults, and what is done in a rural health district is presented by Dr. G. M. Little, Red Deer Health District, Alberta. Dr. Little gives a picture of what is done when there is one man for everything except nursing and sanitary inspection. (*Canadian Public Health Journal*, 105 Bond St., Toronto, Ont., May, 1934. 35 cents.) What is particularly needed is a detailed description of the job of getting health education done under such circumstances; what time is given to it; how to decide what to be done; what use is made of committees and other volunteers.

The health values of "Education Through Physical Education" are reviewed by J. E. Rogers in *Mind and Body*, New Ulm, Minn., March, 1934. 20 cents.

What a community should know about the local aspects of public information on social hygiene is a section of "Organizing a Community Social Hygiene Program." There are ques-

tions about what the health agencies do, the newspapers and the public library. In *Journal of Social Hygiene*, 50 W. 50th St., New York, N. Y., May, 1934. 35 cents.

"A Tuberculosis Survey" of Hawaii and Honolulu was two years old when it reached us, but the chapter on popular health instruction and publicity is worthy of mention as presenting what is, probably, a typical situation. Considerable use of various mediums is stated, but qualified by such phases as "no definite effort has been made to . . ."; "There is no coördinated plan of . . ."; etc. "In conclusion, the educational activities for the general public are rather unorganized."

They Know and They Do—"The Chief Duty of the Health Officer," is discussed by Dr. J. D. Applewhite, Macon, Ga., in *Southern Medical Journal*.

It is, of course, necessary that every well regulated health department have certain rules and regulations which require the citizens under its jurisdiction to do certain things and it is necessary from time to time to use the courts to force some individual to comply with them. However necessary such regulations may be, it is far more important that our citizens be so informed that they shall be anxious to comply with all reasonable requirements for their own and the public protection.

Published in full in *Bulletin*, Texas State Dept. of Health, Austin. May, 1934.

The A. M. A. and Health Education—A sketch of the organization and activities of the A. M. A., "The American Medical Association and Its Interest in Health Education," by Dr. W. W. Bauer, in *Journal of Health and Physical Education* (May, 1934), includes:

In 1911, long before health education was a popular subject, the American Medical Association established a Council on Health and

Public Instruction, which has since become the present Bureau of Health and Public Instruction. The purpose of the Bureau is to promote popular understanding of health and the relation of medicine to the public health through such media as *Hygeia*, *The Health Magazine*, pamphlet publications, radio talks, coöperative advisory relationships with lay organizations interested in health education, health exhibits, personal addresses by the Director, and by furnishing material for activities in health education to state, county, and district medical organizations. It also endeavors to further the periodic health examination. It answers thousands of letters every year, addressed to *Hygeia*.

In 1923, the American Medical Association launched a project which has proved to be unique, namely a magazine of national circulation devoted exclusively to authoritative material on health and health education. The magazine was appropriately named *Hygeia*. It was supported for several years at heavy loss and has never been a source of profit to the Association. It is dedicated to the purpose of enlightening the public with relation to health and medical matters and it represents the conviction of the medical profession that the public is entitled to such knowledge about health as can profitably be acquired by non-medical persons. The features of *Hygeia* are articles on various health topics from outstanding lay and medical authors; a department of school health; a juvenile department; a department of questions and answers; pictures of health interest from the far corners of the globe; health news and views in brief; and an advertising section which can be relied upon to be free from harmful exaggeration and misrepresentation.

The Association established a Bureau of Exhibits in 1930, which in addition to managing the Scientific Exhibit at the annual meeting and the permanent central scientific exhibit at headquarters, sends out numerous exhibits in connection with fairs, meetings, and conventions. These latter are of an educational nature and calculated to appeal to lay observers.

Reprints of the article, free. A. M. A., 535 N. Dearborn St., Chicago, Ill.

Classes and Conventions—Courses and convention topics on child health education are no novelty, but mention of courses and addresses on adult health education may well be recorded here as news.

Health education was given several periods on the program of the Annual Conference of Health Officers and Public Health Nurses and the Annual Meeting of the American Assn. of School Physicians, Saratoga Springs, June 25-30:

"Health Education in Rural Communities," by Gilbert D. Forbes, M.D.

"Health Publicity That Gets Results," by Elizabeth Wells, M.D.

"New Method in Public Health Education" (Demonstration of electrical transcription of radio health plays).

"What Can the Hospital Contribute to the Community Nutrition Education?" was presented at a meeting of Michigan Hospital Assn., and Michigan State Nurses Assn.

Rutgers University Summer Session Courses in Public Health Administration, 1934, will include Public Health Education, conducted by C. K. Blanchard.

The Flavor in Writing—Under this heading says *News Bulletin* of Social Work Publicity Council, 130 East 22d St., New York, N. Y. (June, 1934):

From Montreal comes a tip, not meant for copy, but highly applicable: "A year or so ago we had a convention of master bakers in Montreal and apparently there was a lengthy session on the difficulties of selling bakery cakes. One master baker got to his feet and said, 'I know why you can't sell your cakes. You put vanilla in all of them.'"

As vanilla is a too favorite ingredient in social work writing, we have selected this month some unvanillaed examples.

Then follow examples, including two from the health field:

Changing from direct-information-giving to conversational discussions will often vary your flavor. Our old friend, Ben Hustler, in the bulletin of the New Jersey Department of Health in *Public Health News*, March, 1934, has a nice informal way of mixing health information in with the repairing of pistons at his Piketown Garage. Mark Time, looking on at the repairs says that Ben is fine at remembering things, especially Board of Health rules: "Think of all I've forgotten, too;

those incubation periods, for instance. You could stick me on most of them now." "Me stick you," exclaimed Mark. "Why, I don't know yet what they are. What is an incubation period, anyway?" Hustler straightened up and pondered a few seconds. "It's the time it takes a disease to show itself after it begins to grow. Same idea as the incubation time for an egg." Mark knew about eggs. "You mean you set a hen on a clutch of eggs and in 3 weeks the chicks hatch out." "Yes, and when chicken-pox infection gets on the inside of a child, which is a sort of warm, moist, dark, incubator, in about 2 weeks the chicken pox hatches out—all over him." "Humph! I don't see much connection between chicken and chicken pox," g:unted the assessor. "I mean they both follow the laws of nature which set certain lengths of time for things to develop," Ben answered. "The laws hold true whether it's disease or chickens; or 90-day corn or—." "Now let's see about this!" interrupted Mr. Time, becoming interested. "Suppose I was to get typhoid fever from some carrier who infected my food. Could you tell me when I'd begin to get sick?" Hustler worked a freshly oiled piston back and forth as he replied. "Sure, anyone who knew the facts could guess pretty close. You would probably begin to feel tired or so, have a headache and feel sick after 10 days, and go to bed and call the doctor about 2 weeks after you swallowed the germs."

In another health bulletin, the State Board of Health of Kentucky for March, 1934, we find another informal giving out of public health information. A public health nurse working in a pioneer field in Michigan exchanges letters with her old school mate, a rural teacher in the mountains of Kentucky. Each tells the other how a challenge in public health is being met in her own community. Right along with personal news and thanks for some cookies for which the recipe is requested, is such information as: "My immunities are coming up steadily and several schools are on the way to becoming budding health centers. Isn't it surprising what one can accomplish in the homes through the interest of the youngsters! I know that I have not used my teachers half enough, when, after all, they are the key people. . . . As I read your letter, I was aware that I should be stressing more the educational values of first aid kits in all my schools. . . . I'm going to bring in some country children to help in the demonstrations. . . ."

From Kentucky to Michigan goes the news of what happened after the Christmas vacation when the children reported on their trips

to the dentist, to the oculist and to the orthopedic surgeon as recommended by the school nurse. They both make fun of Asthma, the Michigan's nurse's car. Says the Kentuckian: "I can picture you in a cloud of steam, in snow to your knees, high zippers, and with burlap bags in front of your wheels, and you behind shoveling. . . . Just another month down here and the birds come back. . . ."

RADIO

Personal reminiscence is used by Dr. W. A. Plecker of the Virginia Department of Health, Richmond, to get attention to his radio talks. An incident impressed strongly on his mind when he was a child of 8 introduces the talk on "The Effect of Alcoholism on Longevity." An experience as a student personalizes a talk on the prevention of deafness. Other introductions use anecdotes or historical references which carry the reader by easy stages into subjects like "The Conquest of Rabies,"

"Diphtheria in a Happy Family," "Frontier Mothers," and "Fighting Typhoid with Peacock Feathers."

"The Trial of the Tubercle Bacillus," prize-winning radio talk for the 1933 contest conducted by Minnesota Public Health Assn., "is regarded by the contest judges as one of the cleverest and most effective ever presented in these contests." In *Everybody's Health*, 11 W. Summit Ave., St. Paul, Minn. March, 1934. 10 cents.

"Bleeding Gums—The Pink Tooth Brush," by Dr. W. R. Davis, opens with an incident and uses everyday illustrations. *Public Health*, Michigan Dept. of Health, Lansing. Oct., 1933.

"The Public and the Quack" is a friendly explanation of the quack and quackery, and how to avoid both. Connecticut Dept. of Health, Hartford. March 8, 1934.

A New Health Education Service

A NEW health information service in unique form has sprung up as an enterprise of the Association of Women in Public Health, a nation-wide organization of women professionally engaged in some form of public health or health education work.

For several months past a special committee has been active in securing, through the association members, fragments of authoritative health information. These have now been assembled in question and answer form and are

offered as the first installment of a continuing annual service with semi-annual revisions, by means of which the subject matter is kept up to date.

This service is designed to assist schools, colleges, public libraries, boards of health, nursing organizations and others who are concerned with public education in matters of health.

Further information may be obtained by addressing: The Health Knowmeter Committee, Department of Public Health, 100 Nashua St., Boston, Mass.

BOOKS AND REPORTS

A Review of Public Health Realities
—*Papers of Charles V. Chapin, M.D.*
New York: The Commonwealth Fund, September, 1934. 268 pp.
Price, \$1.50.

Dr. Chapin has enjoyed many and well deserved honors—the Presidency of the American Public Health Association and the American Epidemiological Society, the Marcellus Hartley gold medal of the National Academy of Sciences and the W. T. Sedgwick medal of the A.P.H.A., honorary degrees of Sc.D. from Brown and R. I. State College, and LL.D. from Yale. There is no honor more gratifying, however, than the publication of a volume of collected fugitive writings, for this means the preservation in lasting form of the essence of one's life. Two of Dr. Chapin's longer works, *The Sources and Modes of Infection* (1910), and *A Report on State Public Health Work Based on a Survey of State Boards of Health* (1915), have a fixed place among the classics of public health, and the present volume of collected papers should take its place by their side.

An illuminating foreword by Haven Emerson and an admirable outline of Dr. Chapin's life by C. H. Scamman precede the collection of 16 reprinted papers. Six are classed in the field of Public Health Administration, 5 under the head of Control of Communicable Diseases, and 5 as contributions to Epidemiology and Vital Statistics. It is of interest to note that 8 of the 16 papers selected for this volume were either addresses presented before the A.P.H.A. or were first published in this *Journal*.

Five of the papers seem particularly outstanding. *The Fetish of Disinfection*

(1906) and *Studies in Air and Contact Infection at the Providence City Hospital* (1911) contain the basic arguments of *The Sources and Modes of Infection*. *How Shall We Spend the Health Appropriation* (1913) initiates the second major line of Dr. Chapin's endeavors—a line which has borne direct fruit in the work of the Committee on Administrative Practice of the A.P.H.A. These two threads run through many of the other papers and constitute Chapin's outstanding contributions to sanitary science. He taught us that diseases come from persons and not things and that they are spread only by contact, food and animal carriers; and he inspired us to evaluate all our efforts in terms of concrete achievement in a way which has made public health at least approximately a quantitative form of social activity.

The other two papers which seem to the reviewer of most far-reaching significance along more special lines are *Deaths among Taxpayers and Non-Taxpayers* (1924), one of the most suggestive contributions to the vexed question of the relation between health and economic status; and *Changes in Type of Contagious Disease* (1926) the Sedgwick lecture which demonstrates so clearly the existence of variant types of infecting agents in smallpox and scarlet fever.

Perhaps the most important pages in the volume are those devoted to a bibliography of Dr. Chapin's publications including 133 titles. The 16 papers chosen for reprinting are admirably selected; but they may serve best as samples to tempt the reader to search out and study the rest. Dr.

Chapin's contributions to the philosophy and methodology of public health are greater than those of any living man. In the past only Frank, Chadwick, Simon, Shattuck, Sedgwick, and Biggs have perhaps made an equal impress upon public health practice throughout the world. The student of this subject will find in every paper he has written inspiration and sound guidance. The editor and the publishers have therefore rendered a splendid service to us all in the preparation and publication of this volume. C.-E. A. WINSLOW

Influenza. Part I.—By David Thomson and Robert Thomson. Williams & Wilkins, 1933. 640 pp. Price, \$12.50.

Students of the problems of bacteriology and allied sciences have learned to value the compilations issued by the Pickett Thompson Research Laboratory. Vol. IX is devoted to an arrangement and summary of the world literature dealing with influenza. It is not surprising that a subject so engaging to clinician, epidemiologist, and bacteriologist cannot be compressed into 700 pages; consequently the present volume represents but the first half of the vast undertaking.

The outstanding weakness of such a work is obviously that influenza is more of a name than a clinical entity, and the authors have been forced to include material dealing with a variety of disorders because exact criteria of diagnosis and identification are lacking. The casual reader is at once disturbed by the mass of conflicting data presented and the thousands of contributions written in the name of science which in the light of a more mature judgment hardly justify consideration. However, in this most complete of summaries, each point of view is so patiently and fairly presented that were it not for occasional gentle and skillful direction

on the part of the editors, a complete critical breakdown would ensue.

A volume of this kind is always impressive; not only is it a masterpiece in collecting and organizing knowledge, but it is in itself an epic, portraying through its very confusion mankind's gropings to solve and eradicate this and other natural scourges. That he has failed thus far in the instance of influenza must be admitted. In spite of the most careful study of bacteria associated with the disease, none, not even the Pfeiffer group, can be demonstrated conclusively as the primary etiological agent. Recent isolation of various filtrable viruses which attack the respiratory tract offers at present the best solution of the problem. Even more attractive is the hypothesis that these ultra microscopic agents may act in symbiosis with various pathogenic bacteria. In spite of the temptation to accept the virus theory which is strongly suggested by contemporary work, the editors maintain the same excellent critique which is characteristic throughout the entire work.

FRANKLIN M. HANGER

The Biology of the Protozoa—By Gary N. Calkins, Ph.D., Sc.D. (2nd ed.) Philadelphia: Lea & Febiger, 1934. 607 pp. Price, \$7.50.

Fundamental biological aspects of the unicellular animals, with observations on parasitic forms, are considered in a comprehensive manner in this volume by an author who has devoted many years to teaching and research. Illustrations are mainly from free-living forms. The concept, developed in the first edition, of a changing organization brought about by continued metabolism, has been amplified and furnishes the basis for an interpretation of life histories, biological phenomena of cell division, maturity, sex differentiation, fertilization, and senescence.

A new chapter on parasitism and disease has been added. Here are discussed effects of protozoan parasites on the host, parasitic flagellates including a list of species of trypanosomes, parasitic rhizopods, and the more important sporozoan parasites of man. The text is well illustrated with engravings and colored plates. This useful book has been materially strengthened by revision; it is carefully edited and well printed.

IRA V. HISCOCK

A Study of School Health Standards
—By *Anette M. Phelan*, 1934. Sold by the Book Service, American Public Health Association, New York, N. Y. 249 pp. Price, \$2.50.

This text is based on a questionnaire study of the opinions of 60 carefully selected individuals, whose official positions and activities would seem to indicate that they were competent to judge of the needs of a school health program.

Before arriving at the standards themselves, there is a good summary of much of the literature showing the development of school health procedures. This discussion and its bibliography are arranged conveniently in time periods.

After discussing the Problem, and Consideration of the Results as a Whole, there are presented chapters on the comparative merits of work done by professional and by lay workers, on the hygiene of the school plant, on the classification of children and special education, and on a group of other school health problems such as health of teachers and health education materials. The chapters on school plants, on classification of children and special education, and on the health of teachers and the use of health teaching materials are the most worth while of the text.

While there is much of value in this report, it is seriously weakened by the prolonged dull discussion of details as to procedure. The close adherence to

thesis making formulae is possibly responsible for this.

There is some duplication of statements that more careful editing should have eliminated.

CHARLES H. KEENE

Diseases Peculiar to Civilized Man: Clinical Management and Surgical Treatment—By *George Crile, M.D.* New York: Macmillan, 1934. 427 pp. Price, \$5.00.

In this book the author essentially continues his thesis of the kinetic drive which was developed a number of years ago. He has gone a step further and endeavored to show the essential physiological mechanism employed in producing a number of diseases peculiar to civilized man, such as neurocirculatory asthenia, hyperthyroidism, peptic ulcer, and diabetes. Elaborating upon the orthogenetic theory of von Nageli and Eimer, he strives to show that man has been developing along one peculiar line, namely, that of the brain, and that with this there has been a very marked development of thyroid and adrenal systems with especial development of the thyroid gland which tends to maintain emotional and mental activity at a constant high level as contrasted with the lower animals which need a more marked development of the adrenal system for a sudden energy demand in fighting, pursuit, or escape. Because of the over-activity of the hypothalamus, which genetically is the older part of the brain, and the center for emotional life, these organs are influenced by the sympathetic nervous system. In the more intellectually alert and emotional individuals there is likely to be too great activity of the adrenal system producing a lack of harmonic function. This in turn by increasing the activity of the hypothalamus, sets up a vicious circle which results in hyperthyroidism; increased activity of the islands of Langerhans causing diabetes; or the

rapid heart, cold sweaty extremities and fatigue of the neurocirculatory asthenia.

This book should be very stimulating to both the physician and the educated layman, as the approach to these diseases is considerably different from that of any other writers on the subject. However, the author has failed to consider some aspects of two important diseases: (1) the tendency of diabetes to follow acute infections as postulated by Allen, and (2) the very definite geographical distribution of hyperthyroidism. It would seem here that the thesis of the author has not fully explained their etiology.

E. D. BASKETT

Keeping Campers Fit: The Theory and Practice of Camp Nursing—

By Elena E. Williams. New York: Dutton, 1934. 227 pp. Price, \$2.50.

After an excellent summary of the needed qualities for success as a camp nurse and of the general scope of her "job," there are chapters on medical equipment in camp and for various types of trips, medicines most likely to be needed, emergency appliances, and treatments; a discussion of types of cases likely to be met varying all the way from poison ivy and camp accidents to communicable disease control; and technic of artificial respiration; and health and first aid instruction.

There is also a chapter on the legal responsibility of the nurse and one on preventive measures, such as physical examinations of campers—including height and weight—dietary care, respiratory, skin, and eye-ear infections, contagious disease control, and the control of fatigue.

This is an excellent text, evidently based on experience as well as on training. It should be extremely valuable, not only to camp nurses, but to camp directors and counselors and to others responsible for the health of camps or campers.

CHARLES H. KEENE

Introduction to Food Bacteriology

—By Andrew Moldavan, M.Sc. Lancaster, Pa.: Science Press, 1934. Distributed by the Author. 172 pp.

In the short space of 172 pages the author has endeavored to present a concise survey of the whole field of bacteriology, and of food bacteriology in particular. Much information has been condensed into a small space and consequently only one-third of the contents has been allotted to food bacteriology.

It is evident that a thorough study of the most recent literature has been made and that the author has sifted out that information which he considered most pertinent for use in this volume.

The book is too technical and condensed for the lay reader and would need supplementary explanation to make many points understandable to the average college undergraduate in science. For use in a short course to more advanced students well versed in the sciences, or as a means of review for the professional man, the book would be of value.

More care in the proof reading would have helped in eliminating numerous mistakes which detract from the quality of the book.

J. A. CLAGUE

A Health Program for the Children

of a County—By Thomas Gordon Bennett, Ph.D. New York: Bureau of Publications, Teachers College, Columbia University, 1933. 196 pp. Price, \$2.00.

This study assembles a mass of data which has appeared already in various reports and surveys from individuals and organizations, both public and private. The 5½ pages of fine print bibliography at the end attest this fact. Much of the material deals with school health programs and health education, although other elements are given due consideration.

The original part of the study is sup-

plied by a survey of the health conditions of Queen Anne's County, Md., for the year 1930-1931, and the application of accepted principles to the organization of a County Health Unit.

The chapter on the Health Center is well conceived and sets forth clearly, concisely, and to the point, the objectives, organization, administration, and financial support for a health center as it might be developed in a typical county. It is definitely stated that "the medical, social, and welfare service should function as a *complete unit* in the health program for the children of a county."

The method of presentation and format of the book follows the familiar pattern of the Bureau of Publications of Teachers College, Columbia University.

RICHARD A. BOLT

Industrial Toxicology — By Alice Hamilton, M.D. New York: Harper, 1934. 352 pp. Price, \$3.00.

This compact little octavo contains a wealth of material upon industrial toxicology, excellently organized, comprehensive, and tersely stated. The author is too well known in this field to need introduction, even to the rank and file of lay persons, at least those who read. Contrary to one's expectation, this book is not a mere abstract of the author's larger work on *Industrial Poisons in the United States*, but is quite an independent monograph based upon the author's own broad experience and no less than 655 citations from perhaps half of that number of investigators whose names have appeared within the "scientific era," and, of course, largely those of recent times. We noted many references as of 1931 and some later.

With a fitting introduction viewing the health of the working class and its protection against poisoning, the ten chapters are devoted to the principal industrial intoxicants. However, each

poisonous substance is considered as an entity in itself. The more important are given proportionate attention, while there is an adequate discussion of both sides of controversial matters.

A fairly close scrutiny has failed to find material errors. (We did note the undoubted substitution of the term "carbon monoxide" for "carbon tetrachloride" in the reference to Boveri on page 275, but the context would prevent misconstructions here.) While the range of authors cited is enormous for a book of this size, occasional important omissions can be noted, such as reference to K. B. Lehmann's rather extensive article regarding carbon tetrachloride in the *Zentralblatt für Gewerbehygiene, u.s.w.*, May, 1930, the annual reports of the Committee on Lead Poisoning of the American Public Health Association, Oliver's "Dangerous Trades" (1902), and a very few others. Advisedly, we think, for the present time, the author has omitted any reference to silica and whether or not this substance is a "poison." Certain headings which the average practitioner might be seeking in the Index are wanting, such as "spray painting" and "duco," but practically everything to be expected is covered.

An especially commendable feature of the little volume is an alphabetically arranged author-bibliography which shows extensive inclusions from all languages, as well as an author-index for references used in the volume itself.

The author's easy reading style flows on most intriguingly, scarcely ever repeats, and is constantly in contact with its source material. The number of substances covered, from cause to treatment, should create a large demand for the book from all who could be possibly interested in the subject. It is written for physicians but a little use of a dictionary by the lay reader will bring most of its material within easy grasp—and surely in this day and

age, such should be considered a laudable step in self-education.

EMERY R. HAYHURST

Modern Drug Encyclopedia and Therapeutic Guide. By *Jacob Gutman, M.D.* New York: Hoeber, 1934. 1,393 pp. Price, \$7.50.

The above named book, as stated by the author, is intended for physicians, dentists, pharmacists, and medical students; and consists of "a presentation of 8,160 modern, non-pharmaceutical, medicinal preparations, comprising 1,878 drugs and chemicals, 535 biologicals, 860 endocrines, 1,563 ampule medicaments, 209 medical foods, 129 mineral waters, 2,344 individual and group allergens, and 642 miscellaneous products."

This array of therapeutic armamentarium gives an idea of the scope of the book and indicates how rapidly the number of therapeutic preparations is increasing. Of the making of them there seems to be no end. The busy physician cannot keep pace with such cumulative array, so he welcomes an up-to-date summary of new and old preparations together with their uses. Older physicians were taught to know a few drugs well, their indications and uses. Modern practitioners have at least to know a little about a great many new ones. For one disease listed in this book there used to be recommended half a dozen drugs or preparations, this volume names no less than sixty.

Dr. Gutman's book is a valuable reference book for the office or library. It claims to be unbiassed in its statements, by which is apparently meant that the general claims of the manufacturer of the product are set forth without criticism. Some of the preparations mentioned while effective for indicated ailments have been found to carry certain hazards, such as sensitization of the individual. No comment is made on these hazards. While a few

of the preparations belong to the class described by the authors of *100 Million Guinea Pigs*, most of them are Medical Council accepted.

The book sets forth, in order, drugs of known constitution and action, effective combinations, preparations of indicated composition, endocrine preparations, preparations of undeclared composition, endocrine preparations, hypodermic medicaments, biologicals, allergens, foods and beverages, bottled mineral waters, and miscellaneous products, together with a therapeutic guide containing indications for use of preparation mentioned. An exhaustive bibliography with indices is appended.

The volume is well printed and sizeable, considering the wide field covered.

JAMES WALLACE

Tuberculosis in the Child and the Adult—By Francis Marion Pottenger. St. Louis: Mosby, 1934. 611 pp. Price, \$8.50.

Back of this book is the ripened experience of a veteran tuberculosis clinician and crusader. It bears the benchmark of a good teacher—orderly sequence, familiarity with the work of others, and the clearly stated opinions of the author on all debatable and unsettled questions.

The student approaching the problem of tuberculosis for the first time as well as the well read specialist will appreciate especially the chapters on the chronological development of the disease. "Koch's phenomenon," understanding of which is basic to a working knowledge of tuberculosis, gave the impetus to extensive research work. But much that has been written about allergy, sensitivity and immunity is so confusing, if not conflicting, as to leave the student in a maze. Dr. Pottenger's clear description of the successive steps of tuberculosis from the time of the first infection, interpreted in terms of the response of the host to infection and

reinfection, helps to clear the picture. He may have his leanings where theory must bridge the gap, but he has obviously not been stampeded into extreme positions; the story holds water and enables one to understand the complex phenomena resulting from infection. With that as a background, succeeding chapters on the pathogenic changes, the symptoms predicated on them and the varying responses of the host to the tubercle bacillus, are equally illuminating.

There are few corners of the field which Dr. Pottenger has not personally explored, hence he writes with equal facility on the epidemiology, pathology, clinical technic, and surgery of tuberculosis. The critic might object that certain aspects are unduly dilated, leading one to suspect that the author is a hobby rider. He would doubtless point to the chapter on tuberculin therapy, the painstaking description of pulmonary reflexes elicited by palpation, the discussion of visceral neurology, but these are special fields in which the author has made original and pertinent observations. In fact, it is this feature of the book that lifts it out of the common run and places it in the distinguished merit class.

The illustrations, nearly all original, are of excellent quality and aptly fit the text.

H. E. KLEINSCHMIDT

Children, Young People and Unemployment, Part III. *The Save the Children International Union, 15, Rue Lévrier, Geneva, Switzerland.* Price, \$.50.

Part III of the series of inquiries into the effects of unemployment on children in Bulgaria, Esthonia, Finland, France, Hungary, Norway, and Sweden follows a presentation similar to the material in Parts I and II. Two special chapters on The Crisis and Juvenile Delinquency in Belgium by Paul Wets and Unemployment and Prostitution of

Young Girls by F. Sempkins are included.

While these reports are not exhaustive, they do give a fair picture of what has happened to the youth in these European countries as a result of the depression and unemployment. The conclusions sum up the series of reports: "We come now to the crux of the problem. It must be recognized that when parents cease to contribute in any way to the well-being of the child, and when food, clothing, care, love, all the child's needs, are provided *outside the home*, his relationship to his parents must obviously be affected; so, too, ultimately, the durability of the home and of the family. This must be kept in mind when we come to study the methods of welfare work necessitated by the crisis."

An appendix gives a tabular statement of relief measures which may be employed.

RICHARD A. BOLT

Medicine. A Voyage of Discovery —By Josef Löbel, M.D. *Translated by L. Marie Sieveking and Ian F. D. Morrow.* New York: Farrar and Rinehart, 1934. 341 pp. Price, \$3.00.

This is a well written book of unusual interest. It is a glorification of medical science, and sound reasons are assigned for giving it this exalted position. It is in a large sense a history of medicine, most of which is accurate, though unfortunately, some statements are not.

The author holds that the desire for knowledge probably found its first impetus in medicine, though he recognizes that the first researches were instituted on account of purely practical motives. There are chapters on the underlying sciences, since "a doctor must know something of every calling if he is to understand his own properly." The doctor must understand humanity and life as a whole, looking upon the individual as a link in the continuity of life.

"Anyone wishing to study medicine must first of all realize the fact that everything living forms a unity, that in nature there is but one difference—though indeed this is the greatest contrast of all—the difference between life and death."

The translation from the German appears to be excellent, though there are certain mistakes which one feels must be due to errors in translation or misunderstanding of the author's meaning.

On the whole the book can be recommended to doctors and especially to laymen, most of whom have no conception of the tremendous field which must be covered by the well educated physician nor of the equally large field which must be gained by contact with his fellowmen, especially those who are not entirely normal either through physical or mental illness.

MAZŮCK P. RAVENEL

The Pneumoconiosis Bibliography and Laws—By Davis, Salmonsen and Earlywine. Chicago: Industrial Medicine, 1934. 482 pp. Price, \$7.50.

The remarkable interest shown in the subject of pneumoconiosis stimulated by the exceedingly large number of claims throughout the entire country warranted expectation of an authoritative publication on the subject that would answer the needs of those who have made this subject their special field of interest. *Pneumoconiosis Bibliography and Laws* is a unique collaboration by a physician, lawyer, and reference librarian, resulting in the production of a reference work and source book that will be found to be both convenient and of immense practical value to those interested in the litigation of claims for pneumoconiosis or silicosis. Though the medical features are missing, this gap may perhaps be filled with a subsequent work on the subject.

The ambitious task set up by the

authors of this publication is divided into two sections. The first section on bibliography comprises two-thirds of the entire book, while the remaining section is confined to the subject of the compensation and common law as they relate to dust and its effect on the lung.

The bibliographical material is comprehensive and covers all the references that have both historical and scientific application. There are 2,768 references compared to 1,272 listed by the *Bibliography* published by the International Labor Office as of December, 1931. Not all the historical references are included. One by Martin Pansa, 1614, on "Diseases of Miners and Foundry Men in Annaberg," is not included. A few irrelevant references are noted. Such references as the *Textbook of General and Pathological Anatomy* and other references on lead poisoning seem out of place in a bibliographical account of this kind. The arrangement of the bibliographical material is excellent and many devices have been incorporated to aid the reader in quickly reaching references desired. The value of any bibliography, of course, depends chiefly on the ability of the authors to keep it up to date. The authors in their preface promise to do this by publishing subsequent editions of this reference work.

With regard to the section on Laws, a certain amount of confusion exists in that the title of the book would lead one to believe that the common law or compensation law with specific reference to pneumoconiosis would be considered. However, numerous decisions are quoted covering not only the wide field of occupational disease with such cases as dermatitis and lead poisoning, but also including other decisions with reference to the legal construction of the term "accident." There is, of course, a distinct advantage in including such labor laws as safety, hygiene and hour laws since they may have a direct bearing on

specific cases of litigation in pneumoconiosis. However, the title of the book gives no indication that the broad field of legislation as it applies to industrial hygiene would be covered. The decisions regarding lead poisoning and other occupational hazards are, therefore, essentially irrelevant. It would have been more appropriate to have confined these court decisions to those affecting alleged cases of lung fibrosis or pneumoconiosis alone.

One important decision in the case of the Pennsylvania Pulverizing Company vs. Butler, 61 F. (2nd) 311, is not in-

cluded. This is an important decision since it establishes a precedent in the field of occupational disease litigation that an employer must only exercise reasonable care and need not furnish any unusual or protective devices or information in protecting his worker.

The field of industrial hygiene is a vast one and its ramifications are many. It is difficult, therefore, to confine oneself to any single field. However, this study will have a distinct value for those who have the practical task of arbitrating and adjudicating these claims.

HENRY H. KESSLER

BOOKS RECEIVED

THE CARE AND FEEDING OF CHILDREN. 15th ed. By L. Emmett Holt, Jr. New York: Appleton-Century, 1934. 259 pp. Price, \$1.25.

AMERICAN POCKET MEDICAL DICTIONARY. 15th ed. By W. A. Newman Dorland. Philadelphia: Saunders, 1934. 920 pp. Price, Plain, \$2.00, Thumb Index, \$2.50.

A SOLDIER IN SCIENCE. The Autobiography of Bailey K. Ashford. New York: Morrow, 1934. 425 pp. Price, \$3.50.

A TEXT-BOOK OF MEDICAL DISEASES FOR NURSES, INCLUDING NURSING CARE. 2d ed. By Arthur A. Stevens and Florence Anna Ambler. Philadelphia: Saunders, 1934. 513 pp. Price, \$2.75.

A TEXTBOOK OF BACTERIOLOGY WITH A SECTION ON PATHOGENIC PROTOZOA. 7th ed. By Hans Zinsser and Stanhope Bayne-Jones.

New York: Appleton-Century, 1934. 1226 pp. Price, \$8.00.

A MANUAL OF SOCIAL DISEASES. For the Layman. By Franklin H. Church. Salem, N. J.: S. D. Publishing Co., 1934. 37 pp. Cloth, \$1.00, Paper, \$.50.

THE JEW IN SCIENCE. By Louis Gershenfeld. Philadelphia: The Jewish Publication Society of America, 1934. 224 pp. Price, \$2.75.

MEDICINE MARCHES ON. By Edward Podolsky. New York: Harper, 1934. 343 pp. Price, \$3.50.

HOW TO SUCCEED IN LIFE. By Grenville Kleiser. New York: Funk & Wagnalls, 1934. 330 pp. Price, \$2.00.

TUBERCULOSIS IN THE CHILD AND THE ADULT. By Francis Marion Pottenger. St. Louis: Mosby, 1934. 611 pp. Price, \$8.50.

A SELECTED PUBLIC HEALTH BIBLIOGRAPHY WITH ANNOTATIONS

RAYMOND S. PATTERSON, PH.D.

Brave New World—If you suffer from hardening of the mind, don't attempt this philosophic discussion about whither we are heading; but if you can survive the impact of broad ideas, treat yourself to this mental meal in which there is much red meat especially prepared for sanitarians.

COYLE, D. C. The Changing Order of Today. Pub. Health Nurs. 26, 7:565 (July), 1934.

Modern Health Administrative Measures—Valuable indeed is this brief, straightforward review of the newest public health practice in relation to diphtheria immunization, undulant fever, pellagra, and a dozen other health problems.

CUMMING, H. S. Some New Developments in Public Health. Pub. Health Nurs. 26, 7:358 (July), 1934.

Providing Medical Care—Adequate medical care and preventive services rather than benefits in lieu of wages lost through illness must have priority in any American scheme of sickness insurance.

DAVIS, M. M. The American Approach to Health Insurance. Milbank Quart. 12, 3:203 (July), 1934.

Adolescents' Hearts—In New York about 1 per cent of all adolescents have organic heart disease: a third do not know it. Adequate facilities for the care of cardiacs do not exist.

GOODMAN, M. and PRESCOTT, J. W. Heart Disease Among Adolescent School Children of New York City. J.A.M.A. 103, 3:157 (July 21), 1934.

Fall Colds—During the early fall months a higher than normal respira-

tory rate is associated with lower than normal temperature, a subnormal number of hours of sunshine and an increased relative humidity.

GOVER, M., *et al.* Time Distribution of Common Colds and Its Relation to Corresponding Weather Conditions. Pub. Health Rep. 49, 28:811 (July 13), 1934.

Wanted Babies—The economically fortunate families are practising contraception successfully and producing babies mainly as they want them. The families least favored economically make the least effort to control conception and their efforts are least successful. This is due primarily to ignorance of conceptive methods and not to the desire for large families.

PEARL, R. Second Progress Report on a Study of Family Limitation. Milbank Quart. 12, 3:248 (July), 1934.

Depression-Poor Children—Poor children contract communicable diseases earlier than children in better circumstances. But the "new-poor" have not been in straitened circumstances sufficiently long for their children to acquire the illness immunity of those of the chronically poor.

PERROTT, G. St. J. and COLLINS, S. D. Sickness and the Depression. Milbank Quart. 12, 3:218 (July), 1934.

Disease and the Injured Lung—The relationship of pneumoconiosis to tuberculosis has been studied extensively. This paper broadens the inquiry to include other infectious processes of the lungs. In general, the silicotic lung is more susceptible than the normal lung to any bacterial invasion.

PROSKE, H. O. and SAYERS, R. R. Pul-

monary Infection in Pneumoconiosis. Pub. Health Rep. 49, 29:839 (July 20), 1934.

Fate of Amoeba in Water Purification—Although *E. histolytica* cysts are removed from water by the accepted methods of filtration, chlorine in the amounts usually applied to drinking water will not destroy the cysts.

SPECTOR, B. K., *et al.* Effectiveness of Filtration in Removing from Water, and of Chlorine in Killing, the Causative Organism of Amoebic Dysentery. Pub. Health Rep. 49, 27:786 (July 6), 1934.

Lines of Attack Against Heart Disease—Rational methods of prevention against rheumatic fever and essential hypertension must be developed. Syphilitic heart disease can be eradicated. For the prevention of arteriosclerotic heart disease, there is little to be hoped.

STONE, C. T. The Mortality from Heart Disease: A Challenge. J.A.M.A. 103, 3:151 (July 21), 1934.

Nature's Handiwork—Studies reveal that overweight people have a

better capacity to endure prolonged strain than underweights. To this is appended the comforting conclusion that it is uncommon for overweight people to become underweight and *vice versa*.

TREADGOLD, H. A. Functional Efficiency and Body Build in the Young Male Adult. Lancet 1, 26:1377 (June 30), 1934.

Toxoid Immunization—Alum precipitated toxoid in one dose of 1 c.c. produced 100 per cent Schick negatives in the studies reported.

WALKER, A. A. One Dose Alum Toxoid in Diphtheria Immunization. J.A.M.A. 103, 4:227 (July 28), 1934).

Heat and Stopped Noses—Hill's observation that exposure to heat emanating from dark surfaces tended to close the nostrils was confirmed by this study. But his opinion that radiant heat did not produce the same undesirable phenomenon was not confirmed. Any heat will do it.

WINSLOW, C.-E. A., *et al.* The Influence of Heat and Light Upon Nasal Obstruction. Am. J. Hyg. 20, 1:195 (July), 1934.

ASSOCIATION NEWS

NEW MEMBERS

The following list includes applicants who have been approved for membership in the A.P.H.A. by the Sub-Committee on Eligibility. These new members have requested affiliation with the sections indicated, and action by the Section Councils will follow.

Health Officers Section

- Thomas A. E. Evans, M.D., Farmers, Ky.,
Rowan County Health Officer
P. J. Fitzgibbons, M.D., City Hall, Amsterdam, N. Y., Health Officer
Roy O. Gilbert, M.D., 604 S. Maclay, San Fernando, Calif., District Health Officer
E. J. Latta, M.D., Gaston Bldg., Hastings, Nebr., City Physician
George N. Macdonell, M.D., City Hall, Miami, Fla., Director of Public Health
Dr. Manuel B. Marquez Escobedo, Paseo de la Presa # 37, Guanajuato, Gto, Mexico, Chief of Coordinated Sanitary Services
Perry A. Proudfoot, M.D., 220 Chestnut St., Roselle, N. J., Health Officer
Howard L. Sumner, M.D., Court House, Asheville, N. C., Buncombe County Health Officer
H. A. Tharp, M.D., Mansfield, La., Director, DeSoto Parish Health Unit
John D. Trawick, Armory, Louisville, Ky., Jefferson County Health Officer
Nellie S. Vernon, M.D., Associated Bldg., Astoria, Ore., City and County Health Officer

Laboratory Section

- Louisa H. Bacon, M.D., County Hospital, San Bernardino, Calif., Director, County Charity Hospital Laboratory
Alvin G. Foord, M.D., Pasadena Hospital, Pasadena, Calif., formerly Instructor in Public Health and Communicable Diseases, Univ. of Buffalo Medical College
Beatrice F. Howitt, M.A., Hooper Foundation, San Francisco, Calif., Research worker in Poliomyelitis
Evelyn M. Krayenbuhl, A.B., 1330 Mill St., San Luis Obispo, Calif., Bacteriologist, County Health Department Laboratory
John J. Miller, Jr., M.D., University of California, Berkeley, Calif., in Department of Bacteriology
Burr T. Snyder, City Laboratory, Sacramento, Calif., Director of Laboratories

- Fred Stimpert, State Board of Health, Helena, Mont., Director, Hygienic Laboratory
Harold A. Thompson, M.D., 907 Medico-Dental Bldg., San Diego, Calif., Bacteriologist, City and County Laboratory
Elsie Wattie, B.S., 8 Belvidere Ave., Worcester, Mass., formerly Biochemist, U. S. Public Health Service.

Public Health Engineering Section

- Walter C. Elford, 1213 S. E. Malden St., Portland, Ore., Chief, Division of Pure Food and Sanitation of Board of Health
Raymond F. Goudey, Box 240, Los Angeles, Calif., Sanitary Engineer, Dept. of Water and Power

Industrial Hygiene Section

- P. A. Bendixen, M.D., 512 Davenport Bank Bldg., Davenport, Ia., Designated Physician, United States Employees Compensation Commission

Food and Nutrition Section

- Paul F. Nichols, M.S., 336 Hilgard Hall, Univ. of Calif., Berkeley, Calif., Assistant Professor, Division of Viticulture and Fruit Products
Victor C. Morgan, B.S., 7445 S. E. 31 Ave., Portland, Ore., Chief Milk Inspector, Bureau of Health

Child Hygiene Section

- Amy L. Hunter, M.D., Dr.P.H., 17 Howe St., New Haven, Conn., Child Health Conference Work

Public Health Education Section

- Helen M. Baukin, Territorial Bldg., Honolulu, T. H., Supervisor, Dental Division, Department of Public Instruction
Florence Becker, 3301 N. Charles St., Baltimore, Md., Director, Dr. Bloodgood's Clinic
Lloyd L. Cullimore, M.D., 290 W. Center, Provo, Utah, Medical Director, and Health Education Instructor, Brigham Young University
Marietta Eurlon, R.N., 1266-7 St., San Diego,

Calif., Clinic Nurse, San Diego Tuberculosis Association

Harriet M. Fitzgerald, 2325 Milvia St., Berkeley, Calif., Dental Hygienist, Berkeley Public Schools

E. E. Gage, M.D., Sioux Falls, S. D., Superintendent, Health Department

Reuben L. Kaufman, M.D., C.P.H., 543 Earlham Drive, Whittier, Calif., County Health Officer

Caro Lane, South Georgia Teachers College, Statesboro, Ga., Teacher, Physical and Health Education

James D. Lennahan, 25 West 43 St., New York, N. Y., Secretary, Life Extension Institute

Roberto E. Peraza, Avenida Michoacan 36, Mexico, D.F., Mex., Medico Conferencista, Department of Health

Lucy K. Proudfoot, R.N., 248-31 St., Hermosa Beach, Calif., School Nurse

Margaret A. Squire, R.N., 1010 Washtenaw Ave., Ypsilanti, Mich., Public Health Nurse

Public Health Nursing Section

Anna R. Barlow, R.N., 223 N. 4 St., Reading, Pa., Director, Visiting Nurse Assn.

Mildred C. Burgh, Coachella, Calif., Riverside County Nurse

Marie D. Chambers, 113 S. Lake St., Madera, Calif., City School Nurse

Rachel C. Colby, 205 W. Main St., New Britain, Conn., Director, Visiting Nurse Assn.

Emma Donenwirth, R.N., City Auditorium, Canton, O., Supt., Visiting Nurse Society

Mary D. Forbes, R.N., 302 Laurens St., Olean, N. Y., Director, Bureau of Public Health Nursing, Cattaraugus County Health Department

Mary V. Gill, 1509 Washington St., Charleston, W. Va., Field Clinic Nurse, West Virginia Tuberculosis and Health Assn.

Florence L. Hoffmann, B.S., 218 Holmes, Eaton Rapids, Mich., Teacher, Health Education

Edith M. Holmstrom, State Dept. of Health, Iowa City, Ia., State Field Nurse, Bureau of Dental Hygiene

Marie L. Kent, 2245 Central Ave., Alameda, Calif., Supervising Clinic Nurse

Kathleen M. Logan, R.N., Rutherford County Health Dept., Murfreesboro, Tenn., Public Health Nurse

Marion R. Long, 317 N. Milton Drive, San Gabriel, Calif., School Nurse

Gertrude Lyons, R.N., 6 B. Wilder Bldg., St. Paul, Minn., Director, St. Paul Baby Welfare

Amy MacOwan, R.N., Palama Settlement, Honolulu, T.H., Director, Nursing Department

Margaret Mallett, R.N., 66 Safford St., Wollaston, Mass., Public Health Nurse

Einma Maurin, 223 New Court Bldg., New Orleans, La., Field Nurse Adviser, State Bd. of Health

Ruth McGregor, R.N., P. O. Box 1193, Bisbee, Ariz., Cochise County Health Unit Nurse

Mabel G. Munro, A.B., 210 Corby Bldg., St. Joseph, Mo., Director, St. Joseph Org. for Public Health Nursing

Jane D. Nicholson, R.N., 2398 Sacramento St., San Francisco, Calif., Supervisor and Instructor of Public Health Nursing, Stanford University Hospital

Clara Ross, B.S., The Rutzler, Charlotte, N. C., Director of Nursing, Charlotte Coöperative Nursing Association

Luella L. Ross, 25 Ridgewood Ave., Wheeling, W. Va., Supervising School Nurse

Molly B. Smith, City Hall, Bay City, Mich., Director of Public Health Nursing, Service of the Civic League

Agnes G. Talcott, 116 W. Temple, Los Angeles, Calif., Director of Nurses, City Health Dept.

Katharine L. Tuttle, R.N., 565-21 St., San Diego, Calif., Executive Secretary, and Director, Visiting Nurses

Eva S. Waldron, 247 Union St., Springfield, Mass., Director, Visiting Nurse Association

Anne M. Weir, R.N., 311 Lloyd Ave., Santa Barbara, Calif., School Nurse

Epidemiology Section

Joe S. Haskell, M.D., C.P.H., 1340 Monticito Drive, Los Angeles, Calif., District Health Officer

Unaffiliated

Robert W. Meals, M.D., 6777 Hollywood Blvd., Los Angeles, Calif., Attending Staff, Los Angeles County Hospital

Frank T. Powers, New Street, Glen Cove, N. Y., Tuberculosis Case-finding by X-Ray Survey Method (Assoc.)

Anna E. R. Robinson, M.D., 36 Clark St., Brooklyn, N. Y., District Health Officer

Charles E. Smith, M.D., D.P.H., 2398 Sacramento St., San Francisco, Calif., Assistant Professor, Dept. of Public Health and Prev. Med., Stanford Univ. School of Med.

NEWS FROM THE FIELD

DR. PETER DIRECTOR OF NAVAJO RESERVATION

W. W. PETER, M.D., Fellow and Life Member of the A.P.H.A. has been named by the Indian Office as Medical Director of the Navajo Reservation. He will function somewhat as a state health officer with the physicians of the various agencies throughout the territory corresponding to county health officers.

Dr. Peter has seen public health and medical service in many lands, including China, the Philippine Islands, the Malay States and near eastern countries. He served as the Director of the Council on Health Education; as Honorary Secretary of the China Central Committee of the American Red Cross; he was a member of the Chinese and Foreign Famine Relief Committee; Assistant Secretary of the American Public Health Association; Director of the Health Service of the Cleanliness Institute; and technical adviser to the Ministry of Health of China. He has lectured widely and is an authoritative writer on public health and health education.

The Navajo Reservation contains 25,000 square miles and has a population of about 45,000. The Navajos, like most American Indians, have a peculiar susceptibility to tuberculosis, and the incidence of childhood cases is high compared to that of the white race. Trachoma, too, has for many years taken a heavy toll from the Indian race. Control of these diseases constitutes a major problem on the reservation.

Dr. Peter will organize field clinics for the early detection of tuberculosis and set up a system of home instruction

in disease care. He will attempt to segregate trachomatous children in boarding schools where they will receive regular intensive treatment, keeping the unaffected children in the day schools where they will be shielded from infection.

In time it is hoped to make a comparable attack upon the venereal disease situation.

It is the plan to interest leading Indians in every community in health problems. Local boards of health will be established with a representation of Indians on them, and Indian sanitary inspectors are to be employed. Already one Indian public health nurse has been trained and sent into the field. It is felt that by placing the responsibility of health largely on the Indians themselves a real attack can be made upon disease among the Navajo.

Memorandum, Office of Indian Affairs, Dept. of the Interior, Washington, D. C.

SICKNESS INSURANCE OF SCHOOL CHILDREN IN SWITZERLAND

SICKNESS insurance of school children, as a supplement to insurance of adults, is required by law in 8 of the 25 cantons of Switzerland, among them Geneva and Saint Gallen; in 7 other cantons, including Bern and Zurich, such insurance is required only in some communes. In several cantons the insurance law applies only to children attending kindergarten or elementary public school: in others it applies to all children of certain ages, whether they attend school or not.

Each insured child pays into the insurance fund about 15 to 20 francs annually (\$2.80 to \$3.80); in case of poverty the payment is made by the commune; in addition the federal

government and the cantons contribute together about half of this amount.

The purpose of the insurance is to provide medical attendance and medicines in case of illness or accident; also when necessary special kinds of treatment, such as ultraviolet-ray, X-ray, or orthopedic. Undernourished children and those in need of recuperation or rest are sent to special resorts in the country or in the mountains. Parents or guardians failing to insure their children or wards are subject to penalties.

The number of insured children increased from 25,000 in 1914, when the social insurance law of 1911 went into effect, to 338,000 in 1932. According to recent reports from Switzerland, the system of children's insurance has been working well. The expected reserves have been accumulated; large numbers of children have been sent to rest homes; and the sick children have been supplied with all the necessary treatment.—*Le Assicurazioni Sociali*, Rome, 1934, No. 1.

DEATHS

MISS ELIZABETH A. GREENER, principal of the School of Nursing and superintendent of nurses at Mount Sinai Hospital, died July 26th at Montclair, N. J.

For the last 2 years she was president of the New York State League of Nursing Education, and she had been president of the New York State Nurses Association. She was one of only 3 nurses ever to receive the French Government's decoration of the *Medaille d'Honneur de l'Hygiene*, conferred on her in 1927 in recognition of her contributions to the field of the nursing of children.

THE death of Dr. E. L. Cornman, President of the Gilliland Laboratories, Marietta, Pa., came as a great

shock. He had been in bad health since November, 1933, following an accident in the field at a dog trial. His condition had progressed favorably and he was considered out of danger and on the road to complete recovery. His death at the last was quite sudden.

Dr. Cornman has been a member of our Association for 8 years. He has been a strong supporter of the Association, always had an exhibit for the Gilliland Laboratories at our meetings, and attended regularly himself. He was a graduate of the Veterinary Department of the University of Pennsylvania. He will be mourned by a wide circle of friends not only in our Association, but in the American Veterinary Medical Association of which he was a prominent member.

HEALTH SERVICE IN ALASKA

DR. VANCE MURRAY of the U. S. Public Health Service, recently detailed to the Indian Bureau, has been appointed Medical Director for the Alaskan Indian territory.

A dentist, 20 hospital nurses, 23 village and traveling nurses, and 6 doctors carry on the Indian Service medical work in Alaska. They will all be supervised and directed by Dr. Murray. Besides this group of government people, there are a few private physicians and medical missionaries, and most of the salmon canning factories maintain a physician.

Over a territory extending from Juneau, his headquarters, Dr. Murray will travel as far as Point Barrow, at the extreme northern tip of Alaska, supervising and directing the Indian medical work.

NEW YORK STATE NURSES' CONVENTION

THE NEW YORK State Nurses Association and its affiliated bodies will meet in Buffalo October 15 to 19

in annual convention. The general theme of the program will be "The Nurse and Community Relationships."

Among the many speakers scheduled are Dr. Thomas Parran, Jr., Dr. Donald Armstrong, Clara Quereau, and Dr. George Ruhland. Mrs. A. L. Hansen, 181 Franklin Street, Buffalo, is general chairman of the convention committee.

PERSONALS

EVART G. ROUTZAHN, F.A.P.H.A., will, on October 1, retire from the active staff of the Russell Sage Foundation of which he has been a member for twenty-two years. Happily this means no diminution of his service to the many and varied extra-mural activities with which he has long been identified. Social work and public-health education will continue to enjoy his contribution to their graphic and popular interpretation.—*Survey*, Aug., 1934.

JOHN HALL, of Freehold, N. J., member A.P.H.A., has been elected Executive Secretary of the New Jersey Health and Sanitary Association.

DR. ZACK P. MITCHELL, of Weldon, N. Car., has been elected Health Officer of Vance County. The county has been without a health official since the resignation of Dr. Crete N. Sisk, of Henderson, the early part of the year.

DR. FRANK S. FELLOWS, of the U. S. Public Health Service, who is now medical director of the Indian Bureau in Alaska, has been transferred to the southwest (territory including Arizona, New Mexico and southern Colorado) with headquarters in Albuquerque, N. Mex., to succeed Dr. Langdon R. White, who has been transferred to the territory surrounding Minneapolis.

CONFERENCES

Sept. 2, State Laboratory Directors' Conference, for Directors of State Laboratories and their principal assistants only, University Club, Pasadena, Calif.

Sept. 3-6, 63rd Annual Meeting, American Public Health Association, Pasadena, Calif.; headquarters, Huntington Hotel and Maryland Hotel.

Sept. 4-6, 9th Conference of the International Union Against Tuberculosis, Warsaw, Poland.

Sept. 10-13, 13th annual scientific and clinical session of the American Congress of Physical Therapy, Philadelphia, Pa.

Oct. 8-10, Annual Meeting of the Association of Military Surgeons of the United States, Medical Field Service School, Carlisle Barracks, Pa.

Oct. 15-18, 17th Annual Meeting of the American Dietetic Association, Washington, D. C.

Oct. 15-19, American College of Surgeons, Boston, Mass.

Oct. 15-19, Annual Convention, New York State Nurses Association and its affiliated bodies, Buffalo, N. Y.

Nov. 13-16, Southern Medical Association, San Antonio, Tex.

Nov. 16, 17, 60th Anniversary Meeting, New Jersey Health and Sanitary Association, Berkeley-Carteret Hotel, Asbury Park, N. J.

Dec. 27-30, Annual Science Exhibition of the American Association for the Advancement of Science and Associated Societies, Pittsburgh, Pa.

April 29-May 3, 1935, 19th Annual Clinical Session of the American College of Physicians, Philadelphia, Pa.

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Public Health Awaits Social Courage^{*}

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SCIENCE in its varied and attractive aspects will be offered to you at this, as in former meetings of our Association, by competent and industrious devotees and contributors. History, prophecy, organization, the progress of our art, former and current triumphs in disease prevention, all have been amply and handsomely dealt with by my predecessors in this honorable office.

It will be my pleasure, even at the risk of yours, to offer you opinions rather than rigorous fact, and to tempt you, if you will let me, to look at the necessity for courage as well as knowledge, for the will-to-do, and, when indicated, the decision not to do, as our people may require. I offer you therefore the title "Public Health Awaits Social Courage."

Our concern is with the use of biological knowledge through the instrument of civil government, and with the authority which this exercises through laws and public education over communities organized voluntarily, and

served by their representatives freely chosen. It is the use by man of natural forces, his conquest of other living things for his own security that distinguishes the civilization which we share in today from those that preceded ours, back into the earliest records of human accomplishment.

If the tendency of the succeeding waves of civilization to be of longer duration, and of the intervals of barbarism to be briefer, is to be maintained, it will come about apparently more through increasing wisdom in the control and processes of human life than by the agencies of wealth, and power over material things.

The natural sciences have been harnessed to and by society for generations, but in the more distant past as a means to physical strength and possession, or for the command of the wherewithal of food and shelter, rather than intentionally and specifically to triumph over sickness, to guarantee infant survival, and to enlarge the quantity, and ennoble the quality of human life, by removal of any hindrance to its security. The wisdom and ingenuity of breeders, the skill and trained imagination of horticulturists

^{*} Presidential Address delivered at the First General Session of the American Public Health Association at its Sixty-third Annual Meeting in Pasadena, Calif., September 3, 1934.

have sometimes brought such superabundance of food upon us that national surfeit has been commoner than famine. We actually from time to time find ourselves embarrassed by the paradox of our plenty, and have been occasionally all but smothered by a plethora of sustenance.

It is upon the Department of Health of every political unit of area and population in the modern world that a splendid charge is placed in our trusteeship; guardianship of life for the benefit of each human soul and body within the respective jurisdiction.

From the least, the simple group of village, town or county, up through city, state, and nation, to the culmination of hopeful collaboration over the five continents of the earth through the League of Nations, the duty is the same; the knowledge is identical; only the need and the selective appropriateness of application vary as race, climate, and ways of work create different problems and determine the resources to meet them.

It is not for us to assume an expertness in the economics of production, of transport, exchange, or profitable disposal of that wealth which water and warmth wring from the surface of the earth, nor yet ours the burden to play the rôle of social engineers bent upon ending perennial or periodic poverty. It is enough that we have chosen a way of life, and an arduous preparation to fit us to know how families and communities can accomplish their destinies with least human loss or damage. This we achieve with but uncertain and indifferent success by the art and science we call public health. It is not the biology of agriculture and animal husbandry I would select for discussion today but the use of natural history for the sake of human history which I would persuade you has made romance of contemporary social progress. To quote a philosopher of a hundred years

ago "Natural history by itself has no value, it is like a single sex, but marry it to human history and it is poetry." It is this poetry which entrances us and pledges our continuing loyalty to our profession.

It would be as trite as it is tempting to review the triumphs of our nation, of our maelstrom of races, of both sexes and every age, in the steady forward progress of life security within the existence of this Association. Abler presidents than I have raised the applause due to giants of sanitation, to disciples of bacteriology, to patient plodders in personal hygiene. It is enough to recall that progress has been all but continuous, uninterrupted, and cumulative in its pace, reaching a new zenith in these past 5 years of colossal economic confusion, of frustration of finance, of collapse of commerce, of arrest in industry and labor.

Let me rather accompany you into that discipline of mind, and through that humility of spirit which comes from attempting to foresee the future, looking for new triumphs, and seeing in the failures of today a most precious experience for our successors.

If I were challenged to describe the elements necessary to assure further improvement of human health in our associated nations, these three would seem real and pressing: some increase in effective intelligence; something of the spirit of religious devotion even to the point of self-denial in the material possessions and accessories of today's life; and lastly, courage to apply what biology has taught us to believe.

In the matter of raising the general intelligence level a little, our rôle can be only secondary, as of any other professional group. That shrewd historian, Kirsopp Lake, observed "If the general intelligence rate rises even a fraction of one per cent, that rise constitutes a revolution in social condi-

tions." It would indeed be evidence that no mean fraction had been gained if tradition, superstition, a certain herd or sheep-mindedness of our people were replaced by reasoning based on objective observation of fact, and by a habit of thought which leads to controlled experiment for answers.

The Moro warrior who asks to be vaccinated because he sees his children saved from smallpox, the South Sea Islander who crowds the clinic to experience the miracle of arsenical treatment for yaws, has from the biological point of view attained a level of intelligence far beyond that of the silly thousands of our fellow citizens who trust their pseudo-consciences rather than the doctor's brain, their religious creed instead of nature's evidence.

Our part in lifting the intelligence level will always be a modest one, but we can none the less add a bit to the pressure upward. We can speak with reverent honesty of the truths of life so that there will be utter and consistent trust in our facts, in our reasoning, and in the certainty of our conclusions.

Better silence and patience than the glib inaccuracy of prolific popular promoters.

It is a very present need that half-truths, however popular, do not appear in health bulletins, that none but modest claims be made for prevention or treatment of disease. Rather let the application of a new truth lag by months behind the record of successful experiment than have to excuse the falsehood of a premature publicity about some uncorroborated claim of discovery. Intelligence levels will never rise while the spoon-fed multitude is persuaded out of its earnings by specious and deceptive advertising.

Complacent acceptance of obviously false claims of healthfulness for foods, drugs, soaps, cigarettes, candies, cough drops, illuminated milk, ice, bread, and porridges, challenges our standard of

truthful education in the community. No health officer or agent, however humble, is doing his or her share in blocking error and stimulating critical thought and useful action, if he does not use his public authority to refute the false claims of advertisers of foods and drugs, and a multitude of pseudo-health contraptions. I see no excuse for temporizing with the advertiser when his sales talk is in direct or implied opposition to fact. The society that trusts you to protect it against bacteria and their vectors will support you when you raise your voice and use your powers to frustrate that most noisome of human insects, the man who sells his goods on a false fear of illness or on a futile hope of health.

Even if the Tugwell Bill, a splendid gesture for new liberty of the consumer from food and drug abuse, did not this time become law, at least the State of New York has found it possible to levy upon an industry and the taxpayer to advertise the high worth of a precious product. New Yorkers are investing half a million dollars in governmental advertising of milk, an innovation in functions of state government which might well extend to other essentials so that car cards and radio nonsense may be shamed, or replaced by simple truth. Better emphasize the good than enter controversy with the vicious, but let us at least be not indifferent to error and deceit in the marketing and advertising of foods and drugs.

It is not the authority of the law, nor new knowledge, nor efficient organization, nor even money that is needed, but opinions based on fact, ideas grown in reason, concepts, declarations of independence from the trammels of outworn tradition, of abusive repetition of all too common customs, that will lift intelligence levels and force the salesman and advertiser to be truthful, and to that extent honest.

Power of publicity, of free access to

the eyes and ears of the thoughtless multitude, if divorced from a sense of responsibility to the consumer, to the group, to the social order, is as great a menace as polluted water or unpasteurized milk.

As to self-denial, even to some extent a religious or emotional devotion or self-sacrifice, let me express a personal preference for attaining our objectives rather by going without some things than by "go-getting" everything to be had. A natural practical philosophy of the pioneer, of the pampered pupil of plenty, is spending oneself into perpetual prosperity. Perhaps this has been a safe, successful and useful principle of personal and public conduct in the infantile, the immature period of rapidly expanding population, with immigrant and birth rates both high. With today's ageing population, with the largest state population already showing an annual loss among its native born population of one-half of one per cent, an increasing discrepancy between production of wealth and its expenditure for the lengthening education and maturity of youth, and for an increasing span of age and decrepitude, will force us to a choice between sacrificing some of our accessory, costly but superfluous and unnecessary expenditures, or abandoning our investments in health and culture.

Taking only 5 major items of individual expenditure, wholly within the choice of each of us to forego, to reduce, or wholly to omit, and recognizing that no one of these objects or costs contributes to any material degree, if in fact at all, to the personal or racial health or benefit of our people, we find that approximately 9 billion dollars are spent annually in this country for tea, coffee, tobacco, alcohol, and cosmetics (including services). It is not that I would condemn these expenditures as vicious, sinful, or wasteful, but that, as

between the satisfactions they bring to the spender, and those which half this cost would bring if devoted to investment in the use of applied biology to human health, there is a lack of a sense of proportion, of intelligent choice, and thrifty discrimination.

We cannot now or in the reasonably predictable future have all the purchasable accessories at our tables, each contrivance for physical convenience in our homes, the latest speeds for individual transportation, the problematical delights of universal intercommunication, and also command the facilities, the personal services, the benefits in home and work of that use of natural science in the everyday life of work and play, profit and pleasure, which public health in its broadest sense can bring to a certain fruition.

The greatest effectual block against the minimum essential, the moderate but desirable, and the optimum advantageous expenditure by individuals and the community for personal and public health, is not ignorance, not politics, not religious or antisocial antagonism, but the competition of commercial advertising, the pressure of personal pleasures for the cash in the consumer's pocketbook, the inertia of spending habits.

To meet this competition is needed, not more advertising, not an increase in competitive promotion of services and products, but a serious will to attain the more enduring satisfactions, the deeper securities of life, the necessities of cleanliness, nutrition, recreation, leisure upon which a more rational way of life can be based.

If a per capita annual expenditure of \$72 has been by habit, inclination, and commercial persuasion, saddled upon our people for dietary drugs, for the brief comforts of taste and smell, for the evanescent mask of painted pulchritude, a moderate self-denial would permit enough diversion of funds to finance

the most ambitious scale of expenditure for personal and public health which the imagination and proposals of competent persons has yet expressed.

I see no likelihood of new money being freed for constructive social and cultural progress otherwise than by going without some of the current self-indulgence, and furthermore in such modest self-restraint for health there would be a distinct contribution to that still intangible and distant hope, better mental health.

It is by self-control and self-restraint that man is chiefly distinguished from the brute. Reduction in the use of dietary drugs, in the facile deception of an imitation of honest loveliness would of themselves add a stronger quality to contemporary behavior.

I would not particularly emphasize the leading rôle only of these 5 unproductive objects of common expense, but more that gluttony in foods, waste in the fallacies of the shifting fancies, and a general slovenliness and unthriftiness among our people readily account for sums which in some Utopian existence might be diverted to the luxury of health.

If we would grow, progress, and truly enjoy the precious treasures of life, we will doubtless find it necessary to choose between these and the flitting accessories of an artificially desirable manner of life. If security, beauty, leisure to think, and to add to the durable satisfactions of life, are our choice, we shall attain them only by voluntary and determined sacrifice of what Plato called the appetitive forms of desire. After all, individual choice and the use of it is the distinction between a culture, a government, a society of tradition or slavery, and one with the ambitions of those democracies which our Association represents.

Self-denial in small things would be a good promise of achievement of communal restraint in great affairs.

How can we expect to abandon war as a social debauch, a mass anesthetic, a moral depressant, really an exhilaration of formally approved violence and murder, if we have not learned to live our individual lives without the aid of drugs?

Let us also practise self-denial by refraining from the use of fear as a motive of self-protection, of personal conduct, and personal hygiene. Avoid threats of disease as arguments for good conduct. Use instead appeals to intelligence, and worthy use of the body and its life as entrusted to us. Let us deny ourselves the emotional indulgence of campaigns against non-essentials. Distinguish between the annoyance of noise, the unesthetic effect of untidiness, and the violence to health and safety in gluttony, self-drugging, and over-crowding. Let us get worked up over spitting, but leave litter abatement to housekeepers. Lend a sympathetic ear to those who believe their irritability results from other people's noise, but raise particular hob if any privy is unsanitary. Hold to the course of essential sanitation before sharing with those who fuss over outdoor dustiness and smells and robust racket.

As to the last of my suggested trio of collaborators for an ampler national health; courage to invent, to test, to apply; courage of society to demand those services which science is ready to perform; let me remind you of a phrase from his *History of Civilization* by the pre-Victorian historian, Buckle, "The great enemy of knowledge is not error but inertness. All that we want is discussion and then we are sure to do well no matter what our blunders may be"; and again, "The progress of civilization varies directly as 'skepticism' the disposition to doubt and investigate, and inversely as 'credulity' or the 'protective spirit' a disposition to maintain,

without examination established beliefs and practices."

For a stepping up of general intelligence our part though honorable must be indirect and very modest.

To develop a spirit of self-denial in small matters for the sake of great we can help by judicious exposition of the stock in trade of the medical sciences, and by our own example.

But in the matter of social courage for new health levels ours must be the vision, ours the leadership and the challenge of events.

Among a multitude of opportunities to play our own immediate part in the march upon social inertia or cowardice, I have selected several examples.

CLEANLINESS

First in order of sanitary and general social importance for all our populations outside of ordered cities is the age old problem of man's soiling of the surface of the earth. In great areas and for large population groups in the United States proper, more than half of the permanent homes are so equipped and conducted as to preclude the possibility of the most elementary form of personal cleanliness. Until man has so emerged from the level of the beast that he has learned not to make his own shelter, his garden patch, his dooryard, the pathway to and from his work, a source of continuous pollution of his and his family's food, feet, and water, he cannot be considered to have started on the climb to social security. That state and county is a rarity whose health officer can with knowledge and conviction claim that all living, working, school, play, and travel premises within his jurisdiction have such disposal of human waste as meets the simple necessities of decency and cleanliness, or can point to records of sickness and deaths free from those known to be due—and to be due solely—to transfer of feces to food.

It is not that we fail to record the triumphs of cholera control, of typhoid abatement, of great reduction in the diarrheal diseases of the young wherever the sanitary engineer has served the governments of cities. Nor is there reason to be ashamed of the past few decades of effort against parasitic infestations in rural areas of our continental and insular possessions. What should be obvious, but appears to me to be shockingly neglected, is that such a fundamental responsibility of our profession is but partially met. Satisfied with the easy success of sewer systems for the city and town we have passed on in cheerful confidence to other needs of congested centers. We cannot consider ourselves a civilized nation, nor imagine that we have attained even the safety of the Indian nomad with his shifting tepee, until each settlement, shack, house, or place of human habitation and use is so equipped that family and friends, guests, laborers, and travellers can meet the calls of nature without soiling the spot of land they occupy with infecting and infesting organisms. In this generation of frank expression, when few reticences remain of body or mind, of thought or act, let us be Elizabethan in the directness of our language, and insist that the sanitary privy be built before the house is occupied, and that taxes be not levied on any man too poor to build one for his own family.

We have travelled far from the inception of our public school system, when in the State of New York less than half of the schools had any provision whatever for the body wastes of children and teacher. And yet today it is true that even where chromium plated plumbing dazzles the eye and burdens the taxpayer, there are lacking the easy and practical conveniences for washing hands in most of our school buildings. Let boards of trade, chambers of commerce, local newspapers, the churches,

school boards, county supervisors advertise the need and the ambition to have their particular community recorded officially by local and state departments of health as having no home or place of human activity without sanitary privy and closely accessible water and soap. Let children learn in the nursery and school that health begins with cleaning their bodies for their own safety, and of washing their hands for the sake of others.

Here is a challenge to resourceful publicists, for those who prefer weasel words, to such as Chaucer used, a worthy object of campaigns, slogans, drives, and the like. We can point to a spiritual as well as a physical exaltation for the village which achieves a sanitary privy for every home. Let the city health officer advertise the amount of sickness, even in his well sewered community, which can be proved to be due to immediate or remote infection and infestation from bowel to mouth. There is hardly a Porto Rican of the 45,000 served chiefly by our free hospitals and clinics in New York, or a rural laborer from the South to Detroit's automobile factories who does not travel and live a walking museum of potential disease because of insanitary home conditions and personal habits. And the same can be said of other unfavored groups whether white, Negro, Filipino or Japanese. The safest place for these people is of course the modern city with its plumbing and its abundant water. But turn the city dweller into a hitch-hiker, into summer camper, into boarder, traveller, searcher for work, or back-to-the-lander, and he faces the eternal, the first necessity for health, decent disposal of his own body detritus with cleanliness to himself and safety to others. What is axiomatic soon develops social inertia, and it is something akin to this indifference that makes a people more devoted to the enameling of finger nails, and the creas-

ing of trousers than to the sanitary privy as a mark of social distinction. I should not wish any city or county or state to be permitted to compete for health distinction from the A.P.H.A. unless the health officer presented responsible evidence that within his jurisdiction no one lacked means of preventing soil and hand pollution.

The era of environmental sanitation began something that has not been finished. Around the world man's filth remains his health's greatest enemy especially where, as in large areas of the Orient, his necessity for food depends on the fertilization of his crops with human manure. With more than half the people in some of our southern states living at a sanitary level no higher than that of the domestic animals, it will take more than routine public health effort to clean up the mess that man's necessity has created. The cattle in many a certified dairy farm live under a technic of routine cleanliness superior in orderliness and esthetics, as in sanitation, to that in vogue among a large remaining fraction of our population which carries on in fact a hand to mouth existence in filth. I would not quarrel with colleagues who fear the running nose more than the running bowel, and it is a matter of some satisfaction that the peak of deaths and sickness has been shifted from midsummer, and lesions below the diaphragm, to midwinter and spring and the respiratory tract, but I urge upon you serious and sustained reconsideration of the problem of sanitation of fecal disposal as a major unfinished job for which ingenuity and determination, rather than more research or authority are needed.

SYPHILIS

Second only if at all in demand for courage is the pressure of conscience, of science itself, of past and present neglect, to make a frontal attack on

syphilis. Five hundred years of occidental acquaintance with this disease, precise and voluminous knowledge of its clinical manifestations, adequate and exact information as to specific diagnosis and cure, widespread and increasingly competent records of prevalence, universal conviction as to its devastating effects on families as well as individuals, powerful authority and generous voluntary assistance for control and education—these and a multitude of other factors crowd upon us as reasons to hope for, and to promise ourselves, the great achievement of washing the human race clean of pollution. If and when this is done we shall have added years to life expectancy, assured the birth of the wanted child, and created large vacancies in hospitals and asylums.

How can it be that in this instance our knowledge is largely sterile, our ambition thwarted, our strategy weak, the logic of our public conduct confused by traditional reticence. We have done almost everything except make an intelligent and consistent use of our present knowledge. Human instinct we have explained and emphasized, but in no respect altered. Character in youth we have tried to bend and mold to finer proportions and more unselfish ends, with but slight success. Social customs and the exploitations of commerce we have sought to alter or forbid by local and national law, and the power of the League of Nations, with but vacillating response from peoples and governments.

From babyhood to parenthood we have tempted curiosity to satisfy its craving through a newer, franker knowledge of life processes in flower, insect, pet, and human family. Euphemisms we have used in lecture, screen, and public print to save the blush of guilt or innocence and still patients and the reading public know little of the facts of origin, means of transmission, and course of the communicable disease syphilis. We have hinted, and hidden,

and yet hoped for results; and still this malign infection flows almost unrestrained through marriage as through brothel, in childhood, in maturity, and in age. It is of little moment that here and now you should be assailed by figures of incidence and death, by estimates, percentages and rates, by probable errors or significant differences; it is enough to have graven in your minds, ever present in your thoughts, ready for argument and action, that syphilis is the most prevalent communicable disease, and one for the prevention of which we are doing the least, although we have a reservoir of knowledge for instant practical use greater than that for combating any other disease, unless it be diphtheria, or malaria, or hookworm infestation.

We do not know in any substantial number of cases the time, place, source, or manner of infection. We do not know, except in a small number of persons, the presence of the disease at its onset. When we do learn this we fail to use reasonable resourcefulness to discover the person and conditions responsible for the case just reported. We allow patients known to be in the communicable and uncured stages of the disease to escape from supervision in enormous numbers from every syphilis treatment office or institution in this country.

We have no proof that any material reduction in general incidence has resulted from the past 20 years of increasing attention to syphilis as a social and health problem, although in groups of men under military discipline and among students wisely guided by college health services remarkable reductions in occurrence of the disease have been recorded. We know that so small an incidence as two-tenths of one per cent of syphilitic infection is to be found in selected groups of young men and women of university caliber, and that syphilis exists in recognizable form in

as high as 37 per cent of rural white and Negro populations of some southern states. Is it safe, is it compatible with the ambition of our day that there should be any such inequality in disease prevalence in any country where public education is supposed to be the right of every child, and protection of the people's health the first duty of statesmen?

The habits of a large proportion of our people, the insistent pressure of commercialized prostitution aided by the greed of landlords, corruption of courts, and connivance of police, the biological urges of the animal in man and woman, combine to make the problem one of extraordinary difficulty; but the answer would appear to be a direct medical and sanitary attack, so reasonable, so logical, and so sustained as to rouse the public in support, and to challenge today's society to a courageous consideration of human values and prevailing liberties of conduct. What has been accomplished in control of other communicable diseases of man by determined use of medical knowledge can and must be done with syphilis or we are unworthy of our predecessors.

MARRIAGE COUNSELLING

Closely related to the problem of syphilis which is primarily one for physicians, sanitarians, nurses, and educators to solve is that of a health service for marriage advice, primarily in the social interest of family security, but inseparable from medical, legal, and educational implications.

From the early, much criticised, highly controversial, sometimes legally interdicted efforts to translate into common usage by married women and their husbands, through offices or clinics, frankly contraceptive information, by persons of medical or less competent qualifications, there has been abroad and in the United States a steady growth in the understanding of the useful functions such agencies might serve,

the social and educational, and preventive medical concern they have for a mature society, and the auspices under which they may safely be operated.

Since the origin of marriage counselling in 1922 under public control in Vienna, the German speaking countries of Europe have developed a total of 1,100 such centers, of which 900 are under private auspices. The first official bureau was opened in Berlin in 1926; Switzerland opened official marriage advice bureaus in Zurich in 1931 and Basle in 1933. Approximately three-quarters of those who come for advice are concerned with problems of sterility, contraception, therapeutic abortion, and medical conditions contraindicating pregnancy; the majority of the remainder seeking information on questions of inheritable and congenital defect and disease, where mental abnormality, tuberculosis and syphilis exist or are suspected in the family; and a substantial number are concerned with the physiology and pathology of sex adjustment, before and during wedlock. These stations are under some appropriate legally recognized religious, health, educational, or other professional auspices such as we are familiar with in the origin and promotion of prenatal, baby health, tuberculosis, and venereal disease clinics in this country.

In Germany, the school physician is usually in charge and acts as the key person and intermediary between the various medical and social agencies called upon for services. In addition to the official municipal centers, numbering about 200, sickness insurance funds operate a considerable number of marriage advice stations, but most of them are under private auspices, and are supported largely on a service basis by membership fees. On the whole, applicants to these centers are from among the working classes who are unable to pay large fees for diversified services.

Departments of health in many of

the smaller cities (Dresden, Lübeck, Hamburg, Lenz) coöperate with the local sickness insurance funds in operating these centers.

In Freiburg in such a bureau in the Woman's Hospital connected with the University Medical School, advice is given to Roman Catholic and Protestant patients by the same physician, but at different sessions, to permit appropriate collaboration of the priests of the respective churches.

Under Roman Catholic Church auspices women's groups have 50 such centers scattered about Germany. The Protestants have 13, and the Jewish women 2, the applicants in all such centers being directed when necessary to other agencies for medical, legal, and social guidance.

The clientele of these stations falls into three major categories: those seeking advice on premarital problems, those planning marriages, and concerned with uncertainties and difficulties related to child bearing in marriage, and those asking counsel on sex and other problems in and out of wedlock.

The greatest service of the agencies at present operating in the large and small cities of the United States, aside from their contribution to competent professional education in contraception, is that of preventive medicine in the field of venereal disease and pelvic cancer. Seventy of these stations for marriage advice are in 7 of the large cities: New York 25, Los Angeles 12, Chicago 10, San Francisco 9, Philadelphia 6, Cleveland 4, Cincinnati 4, 1 each in 20 cities in the East, 22 in mid-western cities, 9 in west coast cities and, 13 in southern cities.

There are in the United States at present 132 bureaus or agency activities devoted to some or all phases of marriage counselling, contributing directly toward better mental attitudes, avoidance of psychoses and neuroses arising out of maladjustment of ideas and ex-

periences before or during marriage. They also contribute to an honest, clean, and competent knowledge by husbands and wives of technics, procedures, and materials by the use of which choice as to the occurrence and intervals of pregnancy may be exercised, and the mother and family be spared some threatened invalidism. Twenty of these are operated by departments of public health; 25 are in hospitals; 12 do not wish their addresses made public.

European practice provides not only for official sanction but for attendance and service of representatives of three professions, the medical, the legal, and that of social work, each of which has been found necessary to meet the complexes of needs, fears, hopes, and catastrophes which are brought by the voluntary applicants for advice and assistance. Whatever may be one's intuitive, traditional, social, religious, or medical preference in the use of contraceptive information as a proper application of knowledge for the protection and integrity of the family, and to reduce the evidence of inherited and congenital disease and defect, the almost universal familiarity with half-truths on this subject, and the evident effect of their wide application in the falling birth rate make it incumbent upon physicians and health officers to familiarize themselves with organized efforts in this direction at home and abroad.

Furthermore, it would seem to me that rather than allow a disorderly, amateur, and more or less irresponsible development of marriage advice stations to grow, as is the present tendency in the United States, outside of official or organized professional control, it would be well for health officers to confer with the hospitals, medical schools, out-patient and social agencies of their communities to the end that a collaboration of these elements may come about without violence to the susceptibilities

of any church or social group which may hesitate as yet to lend its influence and approval.

There is no more suitable public agency than a hospital or a health department through which the combined services of medicine and social science can be made available to that portion of the public which cannot obtain, through professional channels of independent choice, the information and advice they need.

This is not a matter of choice to be determined by liberal or conservative attitude of mind, nor yet one to be settled on the basis of religious belief, but a question of exact information as to a way of life and adjustment between partners in marriage which is possessed primarily by persons trained in the biological and medical sciences. Preventive medicine of the kind every competent physician is daily concerned with includes advice prior to and during marriage, upon which physical, mental, and emotional health in the home may well depend. So far as preventive medicine is concerned, to be effective otherwise than through the private practitioner of medicine, it will in all probability be practised through the hospitals and health departments. I believe that a suitable outgrowth of the prenatal clinic or conference, and of the baby station as at present conducted by official and volunteer health agencies will be a marriage advice office or conference for men and women, single and married. For our needs at present in this country a physician, nurse, and social worker especially prepared for such a responsibility will be required at each such station.

Both mental hygiene and social hygiene, as these terms are used in our countries, should benefit by the official inclusion of a marriage advice service under the health department or in connection with the outpatient service of a general hospital.

This innovation will require some social initiative, imagination, and courage, in all of which it should be expected that the health officer should share or actually lead.

ALCOHOL

And now for another challenge for the social courage of health workers. Twenty years ago the health department of the City of New York availed itself of its good standing in the community to call to the attention of the public that among the frequent causes of death and disease was the beverage use of alcohol. The pamphlets issued at that time and the abstracts of scientific contributions on the subject were well received, widely copied and quoted. The declaration of public policy formulated in February, 1916, seems appropriate to quote here.

THE HEALTH DEPARTMENT'S ATTITUDE TOWARDS ALCOHOL

On June 29, 1915, at the request of Dr. Goldwater, then the Commissioner of Health, a committee of leading physicians, actuaries, educators, publicists, and others interested in the alcohol question, met to advise with the officers of the health department as to the most effective method of preventing such disease as alcohol causes or to which it contributes.

The opinions, expressed by the committee and the information in the hands of the department of health, as to the part played by alcohol in causing sickness and death, justified the entrance of the Department of Health into a field previously occupied chiefly by moralists rather than physicians.

Just as the control of venereal disease is a technical matter rather than a question of individual or community morals, so the knowledge of the serious effects of the use of alcohol is to be spread by education. As a measure of personal health and public preparedness against preventable disease and disability, this question should be approached from the medical and social point of view and not from that of morality and religion.

Admitting that the drunkard is a social misfit, our interest is rather with those users of alcohol who do not become irresponsible or guilty of antisocial acts. Such individuals are almost always ignorant of the fact that

alcohol decreases resistance to infectious diseases, such as tuberculosis and pneumonia. Alcohol is a depressant and not a stimulant; it drugs the brain and drops the capacity of the nervous system to obey the will. In this way the use of alcohol becomes an important factor in industrial accidents. Entirely aside from its action as a contributory cause in infectious diseases and industrial accidents, the intemperate or continued use of alcohol causes well recognized degenerative diseases.

The Department of Health has no sympathy with and will take no part in legislative or police restrictions or attempts to limit personal liberty in the use of alcoholic beverages. The spread of accurate information among the people as to the effects of alcohol can be depended upon to accomplish more than laws restricting its manufacture or sale.

In the long run, compulsory prohibition will not prohibit until the public is ready to cease using alcohol, at which time restrictive laws will be superfluous.—*Weekly Bull.*, New York City Health Dept., Feb. 19, 1916.

In view of the events of the past 15 years in the United States there is something almost prophetic in this official statement of 18 years ago.

At the Washington meeting of the American Public Health Association in 1917 and at the Cincinnati meeting in 1926 I ventured to present what I believed to be some of the reasons why the beverage use of alcohol should be considered a major problem of public health. In this opinion I had the support of that great educator, President Eliot of Harvard, and such authorities as Sir Arthur Newsholme and Sir George Newman of England. For these and other perhaps more compelling reasons of evidence and conviction I take this third opportunity to emphasize the importance of a rational scientific attitude toward the use of alcoholic drinks which I believe should be formulated and expressed by the official health agencies of this country. This appears to me of particular importance at this time, now that we have passed through more than a decade of political chicanery in attempts to enforce national prohibition, venal misconstruc-

tion of fact in the public press, and a debauching of governments by the liquor interests, and have returned to practically unlimited accessibility of alcohol of all strengths to all persons willing and with the money to buy. May I further emphasize the advisability of having any attitude or formulation of public policy, or efforts to educate the general public, in the actual and potential dangers of beverage alcohol, established by public and official rather than by volunteer or private health agencies.

It is not that I would draw a distinction between the Women's Christian Temperance Union or the Anti-Saloon League and the educational obligations of health departments; but rather to call your attention to the non-performance, the paralysis of interest, the consistent and well sustained aphasia of every national health agency on the subject of alcohol from the date of passage of the Eighteenth Amendment. The public of the United States cannot trust its nonofficial health agencies to guide them in the implications of alcohol as a cause of preventable disease and death in the face of powerful commercial selfishness, or when a particular health topic runs counter to the advertising interests of the public press.

It must be recalled that no one of the always influential and usually generously supported volunteer agencies composing the National Health Council has uttered a word of warning, contributed any substantial information or advice as to health implications of alcohol use, or published a report of new facts and observations of a scientific nature on the subject of beverage alcohol or its effect on human life, since 1920.

Even though the public pronouncements and presidential addresses of the American Social Hygiene Association had, prior to federal prohibition, on

occasion declared the well known and intimate causal or contributory rôle of alcohol in the development of venereal infection through commercialized prostitution, no suggestion has appeared from this association in the past 10 years and more, that there is any special hazard to youth in its recreation or pastimes from the use of alcohol, and yet in this period there was the most flagrant abuse of law and a widespread return of casual and clandestine immorality, developed and encouraged largely by illegal sale of liquor.

Also, the National Committee for Mental Hygiene suddenly became silent on the subject of the damage of this selective brain poison to human mentality, emotions, and behavior, and as a cause of functional nervous and psychic disorders, even though the great and technical leader of the mental hygiene movement, Dr. Thomas Salmon, had publicly declared that all the other mental disorders combined, as found among drivers of automobiles, did not equal in frequency or significance those caused by the use of alcohol. The national health agency which has preempted the field of preventable, toxic, hereditary, and infectious mental disorders for its own, has given no sign of awareness that alcohol was the cause of from 4 to 10 per cent of all new admissions to state hospitals for mental disease, such incidence varying with the alcohol consumption of various racial and economic groups. Certainly the fear of unpopularity acted as a depressant and inhibitor of the will-to-do in this agency, much as the drug alcohol does in the individual.

And again the National Tuberculosis Association, concerned necessarily with the economic and nutritional hazards of the wage earner and his family, as these affect the incidence or activity of tuberculous infection, has failed to make any single contribution to public education on the hazards of alcohol as an article

of diet for old or young, since the daily press turned thumbs-down on sumptuary legislation and encouraged the use of their columns for the deceptive publicity of liquor dealers, and for the encouragement of liquor users.

And lastly the American Child Health Association joined its sister societies in a common silence, not even raising its voice when legalized beer was again temptingly spread upon the advertising pages of our daily press as a sovereign remedy, a wholesome food for nursing mothers, and a suitable daily ration for children of any age. One almost looked expectantly for some word of praise of the rum ration said to have saved the lives of Canada's most recent quintuplets.

These national health agencies always had money for more and better central organization, for the public self-esteem that precedes the annual fund raising, but never a penny to pay for teaching the medical facts about the most widely used, but most harmful drug included in the dietary of modern occidental peoples.

Plainly, if and when conviction that alcohol constitutes a health hazard, more directly under man's own control to prevent than any other of equal significance, and determination to describe its effects in terms of sickness and death, are arrived at among professional health workers, it must be to public health officers supported by the tax payers, not private agencies sensitive to the wishes of a subscribing clientele that we must look for initiative and courage.

What Schmiedeberg and Kraepelin taught in 1883, what Cushny and Bastedo have written and described since 1900, what Benedict, Dodge and Miles have disclosed with exquisite experimental exactness in the past decade will be found accurately written in Emil Bogen's school book for the Department of Education of Los Angeles. It were

a pity that in this respect the public's physician, the health officer who speaks from the highest pulpit of health publicity, should linger still behind the knowledge of the school child in accurate unbiased information and opinion.

Here again if you have convictions bred of knowledge, then have courage to express yourselves for the public's sake. If you are uninformed in the matter, teachers of pharmacology and toxicology are available in every medical school in the land to enlighten you.

DIABETES

A further problem faces us, born it seems to me of the wealth, abundance, and transformation of man's life from one of bodily labor to that of command over machinery. I refer to that disease which has been for two score years and more increasing in incidence and mortality with astonishing uniformity among all classes of the population, in every state, and among both rural and urban dwellers. I refer to diabetes mellitus, recognized in the earliest records of Greek medicine, understood thoroughly on the basis of modern knowledge of body function and food uses, probably in the great mass of instances preventable, and yet to date not included within the concern of any health department except in the form of controversial statistics.

The small fraction of cases of diabetes which can reasonably be attributed to hereditary defect of the structure or function of the pancreas is probably on the increase, owing to the skill of physicians and the discoveries of laboratory workers who save the child diabetic to survive into parenthood, and carry an adult diabetic through the years of procreation, and yet we have no sufficient justification for interfering by law or persuasion with the marriage and child-bearing of those with this inherent defect. There remains the vast

majority of adult diabetics whose manner of life is the major if not the only factor in the development of the disease. The obese, the sedentary, persons of the later decades of life who by occupation and inclination avoid so far as possible, even in their amusement, and games, such exercise of the great mass of body muscles as in the past was necessary for almost anyone, these are the victims of a way of life in which appetite and easy access to abundance in variety and amount of food, and but slight necessity for bodily exertion, are the rule.

As I conceive it this disease is the expression of a change which has been gradual over a hundred years, but is now among us of extreme degree, when man's circumstance is considered before and since the industrial revolution of 1830. Almost every occupation has been metamorphosed by the accessibility of power so that even the daily chores of the home carry no physical burden. White-collar folks, masters of ships or industries, the professions, those who wait and serve food and drink, the employer rather than the employed, the financier rather than the ultimate producer of goods, these are the chief contributors to diabetes mortality, while the agriculturist, the lumberman, the sailor, the smelter and founder, the soldier, cattleman, the day laborer show everywhere a relatively low incidence of the disease.

In some the answer is mere gluttony, not different in nature from the excess expression of any body appetite. In the main bulk of cases however, the problem is one unrecognized by the average man and woman, namely, an imbalance between the body need for fuel to meet the ordinary demands of energy, heat, growth, and repair, and the use of food as tempted by opportunity and supply.

Of course, any disease which selectively prevails among those of the later decades of life will exhibit an increase

with the effective lengthening of life expectancy. Also a city or state with preponderance of those races which tend to engage only in trades or occupations free from much bodily exertion, such as the Jews, will show an increase in diabetes, but it is not race or changing age distribution alone that will account for the rise of diabetes mortality each year to new levels. Nor will the newer skills of diagnosis and treatment, or arbitrary procedures of registration practice explain the entry of diabetes well up among the first 10 causes of death in considerable urban population groups in this country. Diabetes rises with wealth, with command of mechanical power and convenience, with each advance to what some will hail as a bodily millenium, when no one sweats for his livelihood, no one walks to work, and recreation is achieved by exercise only of the little muscles of the eye and ear and fingers.

It is my present belief that health authorities should not only analyze the situation with epidemiological exactness, but issue warnings particularly to persons in the ages and occupations where diabetics are mostly bred, that they must adjust themselves to the mechanistic motorized era by both moderating their own fuel intake and by increasing the physical employment of their great body muscles in work or play.

This is a challenge in the field of hygiene which demands critical approach, and a certain courage in public speech and education, because what seems to me to be the needed word of advice runs counter to man's tendency ever to cherish his indolence, and to delight in lethargy after surfeit.

OCCUPATIONAL DISEASE

I would persuade you to seize and occupy the largest field of preventive medicine, until now excluded from the work of official health organizations in this country. I refer to the prevention

of occupational disease. There has been no greater prophet in the history of medicine than that great clinician and keen epidemiologist Bernardini Ramazzini, who laid the foundation for the study and prevention of diseases of artificers in 1717. One of man's distinctions from the brutes is in his use of tools. With tools and trades came contact with other materials, other environments than the comfortable wholesomeness which the herder, the farmer, and the woodsman knew.

In the finest flowering of a liberal civilization when Italy gave to Europe cities of wealth and culture, Ramazzini detected those beginnings of special hazard among clerks from sitting all day at desks, of those who stood at their work, or delved in mines or handled metals or chemicals. Long before the industrial revolution of 1830 transformed the life of man into one of shop and factory, an obligation was imposed upon sanitarians to protect the workman against ill health and premature death lurking in the very nature of his livelihood.

Organized labor has fought to guard the interests of workmen by compensation for employer's neglect and the unwitting risks of dangerous trades, for accidents and poisonings, but the approach, the benefits, the influence toward betterment has been chiefly through financial pressure on the insurance principle.

Great progress has been made in learning the nature of the physical and psychological damage due to the material and emotional handicaps of a multitude of employments. Great Britain, Germany, most European countries, and many of our states have created official agencies to protect the body and the pocketbook of the working man and woman; and yet, at least with us, only the very fringe of the matter has been touched; hardly more than a beginning has been made, and practically nothing

has been done by departments of health in industrial hygiene. It is true that the self-interest of employers in the larger and well organized industries has brought important tangible improvements by physical safeguards and through the employment of physicians and engineers skilled in abating industrial hazards. Also it is true that the U. S. Public Health Service has accepted the serious responsibility of studying the effects of particular trades and occupations upon the current and subsequent health of workmen. But that is not enough. In addition to workmen's compensation laws, and besides the authority of factory inspection, and to supplement the contribution of industry itself and of the federal government, it should be the acknowledged duty of each department of health of whatever population group from rural county to tightly packed industrial state, to concern itself with every variety of occupational handicap to health, and provide through environmental inspection, through medical examination, and by the technical skills of the laboratory a service in some measure comparable with present control of communicable disease.

It is, as Dr. Osler said, the tragedy of today that man is so indifferent to the life of man. Yes, we surround the babe unborn with premonitory protection, deal wisely and gently with infancy and childhood, and then hurl the product of a reasonably healthy youth into a maelstrom of blind chances, of dusts, fumes and fatigues which wear down the stoutest body and cripple the most willing worker.

Ours is a day of increasing mechanization of infinite complexity, of new chemistry and physics, and of occupations calling for hardly more than the spirit of a Robot.

If we would be true to our own generation, and in our day contribute as the bacteriologists did first 50 years

ago, and as the nutritionists have done in recent decades, we must use our powers of education, of information, of inspection and abatement, to make all employment as nearly compatible with health as our knowledge permits. Let us have the courage to create a division, an office, a sphere of influence in every health department to be concerned with occupational disease.

VOLUNTEER HEALTH AGENCIES

May I venture one further, and my last suggestion calling for a measure of social courage for the sake of public health? This I address chiefly to the generous lay public which supports private health agencies, both national and local. It has been my observation that where there is high quality of professional leadership and reasonably adequate support for the department of health, private health agencies do not multiply or increase in importance. The visiting nurse associations are in my opinion the only volunteer health agencies still indispensable where a community has a well organized health department. This leads to the further opinion that if the time, effort, organizing ability, public spirit, and contributions in cash for volunteer health agencies were diverted to the direct and exclusive support and advancement of the health department, almost any community would be better served than at present, with less cost, less confusion, less rivalry for public credit, and more community self-respect. Protection of the public health, as distinct from the private practise of preventive medicine, is a highly responsible technical and complicated function properly vested in civil government and trusted to professionally trained health officers. In an orderly and mature society the amateur, the volunteer, has no proper place as an agent of public health in a city, county, or other local political unit.

If we have the determination which

I believe we should have to make our form of government an efficient instrument of social progress, we can no longer afford to have an amateur as well as an official government in each community, one run by public spirit and well wishers, the other by elected officers and their appointees.

The good people who support a duplication of governmental functions in health, welfare, and education will do well to attack community needs at the source, and see to it that the health department at least does those things, and does them superlatively well, which philanthropy and executives responsible to volunteer boards can achieve only fractionally under private auspices. It is full time for us to declare our civic independence of amateur health service as we long ago gave over the police and fire departments to local government.

In the present stage of development of civil government I do not see clearly an entirely safe way by which the health and sickness services of the public health and visiting nurses can be absorbed by either the department of health or by any other branch of local government, but as for all other variety of nonofficial local health agencies, distinct from social and relief or family welfare organizations, I believe their discontinuance, with a transfer of interest and support to the health department, would result in a real advance in government in the United States and in the direction of effective non-political health service.

There may still be for a while longer a place for nonofficial national health agencies under some form of central relationship which will permit each such nation-wide organization, devoted to a particular health function, to operate as a bureau of the single central body, thus maintaining a reasonable sense of relative importance in the several fields of health promotion and education.

It should be the declared hope and prospect of this body of professional health workers to encourage the replacement of voluntary by official responsibility for all useful public health functions under government authority. The institutions of professional education and those of scientific research need no other field for demonstration and test of new procedures than the population groups served by agents of civil government. Only by consent of local official health authority can any population unit be used by a private health agency for exposition of some new procedure. As a matter of record I believe it is true that no public health procedure of certain merit has been proposed or applied under private auspices that had not already been applied and made effective by an officer of a governmental health agency.

The local private health agency has served its once useful purpose, as did the Vigilantes and the Stalwarts for suppression of violence and assistance in control of fires, and they should be gently but firmly eased out of the picture while professional official leadership assumes full control of the situation.

SUMMARY

And now, good friends, forgive me if I have not the gift of simplicity and clarity of a Chapin, nor the practical wisdom of a Vaughan, father or son, nor the persuasive logic of a Park, and let me briefly summarize my thesis so that at least some kernel of my thought you may carry off, perhaps to consider, possibly to cast aside as of little merit, but I hope in some measure to test in action and prove in practice.

We are in a position to raise a little the level, and to extend the application of human intelligence. It is our duty to be so faithful to the scientific method, so loyal to the truth, that our authority will be everywhere accepted. To com-

promise with truth for the sake of popularity and publicity hazards the credit of our profession.

It is unlikely that we shall possess such wealth that all can at the same time have the indulgences and the enduring satisfactions or securities of life. Some self-denial, some individual sacrifice of unessentials appear to me to be prior requisites for our investment as liberally in the application of natural sciences to human nature as we know would be both wise and profitable.

A combination of thriftiness, shrewd intelligence, and devotion akin to that of religious crusaders is called for. We who have the knowledge and the vision must teach by example as well as by precept. Five unessentials, the use of which we can if we will reduce, to permit a liberal expenditure for health, are alcohol, tobacco, tea, coffee, and cosmetics.

Then as to social courage for which further advance in public health awaits rather than for more knowledge, wealth or authority:

Let us complete the job of raising man out of the health hazards of his own bodily filth.

Let us directly in the manner of sanitarians and physicians attack syphilis.

Let us acknowledge the evidence of the medical sciences that ethyl alcohol as commonly used for a beverage is a drag on the health and happiness of man, and let us deal with it as a drug

and a poison without the pretense of its being a necessity or a blessing.

Let us teach for the sake of women the knowledge which will permit them to choose the time and circumstance of their own childbearing.

Let us recognize the new health problem of diabetes, a disorder of metabolism which has grown with increased command of foods and the power of mechanics, permitting man's escape from physical drudgery, and teach such adjustment in nutrition and muscular activity as experience indicates.

Let us incorporate within the permanent functions of health departments, protection of employed persons against health handicaps inherent in the place and nature of their work.

Let us build upon the permanent structure of official health services under civil government and divert toward this the public spirit and support, until now applied to local nonofficial health promotion, excepting always the visiting nurse.

Health such as modern man and his family can command awaits not more knowledge, but imagination in the use of what we have, in professional leadership, and social courage to follow and support the leaders. By the quality of your guidance, the future of human life among the four nations professionally represented here will be determined in the decades immediately before us.

The TVA's New Deal in Health*

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THE Tennessee River and its tributaries drain an area of more than 40,000 square miles, extending from Virginia and Western North Carolina through Eastern Tennessee, south and west through Georgia, Alabama, Mississippi, back north through Western Tennessee and across the corner of Kentucky with almost ideally situated areas for storage basins. From its head waters the river falls rapidly to provide excellent power sites at other points in its course. Rich in a multitude of minerals, the drainage basin affords also the possibility of broadly diversified agriculture through its mountainous sections, uplands, and broad valleys. Climatically, its situation is almost ideal, with long growing seasons, adequate rainfalls, and mild winters. More than 2,000,000 people of as fine a native stock as may be found in the nation reside within its boundaries.

In this area are the materials both of natural and vital resources from which, through effective combination, an almost ideal condition of life may be wrought; for there are raw materials of wide variety, potential power in ample quantity, and the human resources essential in effecting a reaction of one upon the other for the creation of usable wealth.

The bringing together of these elements into one coördinated development

is, however, a major problem of organization not possible of solution except through long range planning and unity of approach. It must be remembered in this connection that the drainage basin, though naturally a unit in itself, extends into seven separate states. The unusual richness of resources and the crying need of their development, together with the complexities of the organization problem must have been in President Roosevelt's mind when he expressed his idea of a long range planning in a message to Congress asking creation of the Tennessee Valley Authority. He said, in part:

I, therefore, suggest to the Congress, legislation to create a Tennessee Valley Authority—a corporation clothed with the powers (limited) of government but possessed of the flexibility and initiative of a private enterprise. It should be charged with the broadest duty of planning for the proper use, conservation, and development of the natural resources of the Tennessee River drainage basin and its adjoining territory for the general, social and economic welfare of the nation. This authority should be clothed, also, with the necessary power to carry these plans into effect. Its duty should be the rehabilitation of the Muscle Shoals development and the coördination of it with the wider plan.

Many hard lessons have taught us the human waste that results from lack of planning. Here and there a few wise cities and counties have looked ahead and planned. But our nation has "just grown." It is time to extend planning to a wider field, in this instance comprehending in one great project many states directly concerned with the basin of one of our greatest rivers.

A little more than a year ago the three directors of the Tennessee Valley

* Read before the Health Officers Section of the American Public Health Association at the Sixty-third Annual Meeting in Pasadena, Calif., September 4, 1934.

Authority held their first meeting in a Washington hotel. Since that time more than 100 similar meetings have been held, and nearly 10,000 workers are busily employed in bringing to realization a masterly vision. The Wilson Dam, instead of standing idle, is busily engaged in turning out electrical energy. The Wheeler Dam, 15 miles above Wilson, is approximately one-quarter complete, as is also the Norris Dam, located on the Clinch River, one of the principal tributaries of the Tennessee. Projected for the future are two more storage dams and two run-of-the-river dams. Thus, will come power for the transmutation of raw products through human agencies into usable wealth.

Naturally in view of the rich agricultural possibilities of the basin, agriculture and soil conservation through the prevention of soil erosion, afforestation and soil feeding are receiving their due measure of attention. Indeed, the Tennessee Valley Authority law provides for research in fertilizer manufacture and for the manufacture of fertilizer ingredients whenever it seems wise. With all this attention to natural resources and the production of power, the Authority is not unmindful of the part which the conservation of human resources must play in the realization of its program, for natural resources are practically valueless without human resources. It is, therefore, assuming the rôle of an enlightened employer toward its employees and of a constructive force in the protection and conservation of health. No attempt is being, or will be, made to develop a separate health agency, but rather the purpose is to support, strengthen and develop existing agencies in so far as this seems necessary and desirable.

All activity of this nature is centered in a section of Medical Service and Health, which is located in the Division of Personnel, one of the service divisions.

The primary objectives of the Medical Service are physical examination and classification according to physical status of all applicants for employment; direct medical care for all employees injured in line of duty until responsibility is assumed by the Federal Compensation Commission; emergency medical care for employees away from their natural residence; assistance in the proper placement of employees with physical handicaps; immunization service for all employees; the control of venereal diseases through a familial approach including prophylaxis, treatment, and education of the employee and his family. In addition, this service assumes responsibility for the compilation and clearing of all compensation claims originating from employees of the Authority.

Because of the wide separation of areas for which service is essential, centers have been established at each site of major activity, including the town construction area at Norris, the site of the Norris Dam, the base of the Norris Reservoir Clearance operation, the site of the Wheeler Dam, the Muscle Shoals area, and the base of the Wheeler Reservoir Clearance Area. Each area is under the direction of a medical officer, to whom is assigned essential subordinate personnel.

After physical examination and prior to final employment, prospective employees are classified into four groups according to physical fitness for duty, then given essential immunization and assigned by the personnel director to service. All injuries, even such as appear insignificant, are given immediate first aid and passed on as quickly as possible by a physician at one of the first aid infirmaries. In the opinion of the Director of the Safety Section, the low degree of severity of injuries is in a large measure attributable to thorough physical examination and prompt medical attention to injuries.

While as yet no systematic activity to secure correction of observed physical deficiency has been established because of the pressure of more immediate responsibilities, it is the observation of the field medical officers that corrections are being made in considerable numbers. A more specific approach to this problem is contemplated as early as possible with the available resources.

The problem of health and sanitation service necessarily includes not only such activity as is necessary within areas directly under the jurisdiction of the Authority and having essentially the status of government reservations, but also, through coöperative agreement, this same activity may be extended to areas immediately adjacent so that conditions reacting upon the health and welfare of employees may be dealt with as those occurring within the area. The administration of service within areas directly under the jurisdiction of the Authority is simple and is directed by our own medical officers and engineers. The organization of service outside of such areas must depend upon coöperative agreements with state and local health authorities, since this is their responsibility. Hence, a small fund has been set aside to become available for strengthening local health services in the major areas of operations, where the activity of the Authority complicates local conditions or where local conditions are such as to result in undue hazard to employees. In two major areas of operations, for example, typhoid epidemics—approximately 100 cases in one instance and 40 cases in the other—have indicated not only the desirability, but the actual necessity of coöperation from the Authority.

Questions of food and milk control, general sanitation, and the usual public health services, it is believed can be solved in regard to the safety of employees by strengthening rather than duplicating existing facilities.

Unquestionably, as a result of the vastly increased shore-line of impounded waters within the drainage basin, malaria will become one of the outstanding problems of the future. Here the same long-range planning, characteristic of the vision of the Authority for the project as a whole, is manifest, for this matter has had serious consideration from the time the dams now in process of construction were designed, and provision has been made for such fluctuations of reservoir levels as are essential to a maximum degree of biological control. Some idea of the extent of this problem may be had from the fact that the Norris Lake will have a shore-line of approximately 800 miles, Lake Wheeler a shore-line of approximately 800 miles, making a total of 1,600 miles. Compared with the present shore-line of Lake Wilson, which covers only 125 miles, the tremendous increase in the extent of this problem is apparent immediately.

Not only does malaria offer an additional example of the need for long-range planning, but also an illustration of the desirability of coöperation with state and local health agencies in the development of strong local health services in the areas affected. A first line of defense is an effective local health organization for each county, contiguous to the impounded areas. Coöperative agreements are in process of negotiation with state and local health authorities and will result undoubtedly in more effective and less costly procedures than if an attempt were made to solve the problem unassisted.

In addition to the need for coöperative development of control services, both the opportunity and necessity for special researches are apparent. For example, we need more precise knowledge of our malaria problem and more effective methods for its control. It is desirable that we should investigate the possibility of improving many of our

public health measures and study our administrative procedures.

Through and with the coöperation of existing agencies, material advances in the acquisition of new knowledge and methods of applying existing knowledge should be possible. With these facts in mind, provision has been made for such basic studies both in epidemiological and administrative procedures as now seem desirable for the development of improved methods in dealing with problems incident to or produced by operations of the Authority. Such studies may include analysis and evaluation of needs of rural areas, the development of the most effective and economical methods for meeting these needs; determination of the type of local health organizations capable of putting such methods into effect, and the acquisition of such new knowledge of conditions under which diseases occur, as may be possible.

Plans now being made for the study of malaria will illustrate the care with which these studies are being approached. Almost immediately a study of the possibility of applying airplane dusting to a shore-line, such as we shall have, will be developed. Previous studies have been made of acreage dusting by airplane, but no satisfactory investigation of shore-line dusting is available.

The procedure being followed in developing personnel for studies and control service is of interest. Through the coöperation of one of the foundations, an unusually capable medical officer is being trained in malariology in order that all malaria studies and control service may be directed by a competent person. More than a year of special studies under the best malariologists of the world will be given this officer during his training. Engineering service for malaria studies and control has already been provided. An individual trained in certain of the natural sciences

is contemplated as a possible third element in this work, thus balancing the personnel group and making possible accurate measurements of mosquito and parasite indices, together with special surveys and investigations essential to a definition of the control problem.

Malaria is used as an example of the type of research and method of approach. Unquestionably, the need will arise for investigation of other approaches. Other studies which may afford a basis of future guidance are appropriate administrative units of population; definition of the nature and extent of prevailing health problems; studies of personnel requirements, unit costs, and personnel performance; and field studies of both the epidemiological and survey types.

Nearly all prior studies of rural health service and rural health projects, especially of an administrative nature, have been of a more or less negative character for the reason that they have had inadequate fields of study, or provision has been made for too brief periods of time. Thus, in many such studies the observations have been of deficiencies rather than of positive performance, and conclusions have been reached by inference rather than by logical analysis. It is believed that these difficulties can be avoided in our procedure, and that positive observations rather than negative inferences may become possible.

A *sine qua non* for any scientific study is personnel of high quality and expert training. The policy of the Authority for selection of its employees is admirably epitomized by the Chairman, Dr. A. E. Morgan, in three brief sentences:

There is a provision that no political test of any kind shall enter in the employment of men on this Tennessee Valley Authority work. Men shall be employed on the basis of merit and no other. The TVA is working in that spirit.

The staff of the Health and Medical Sections is composed, therefore, of unusually capable and well trained individuals. This fact is sufficient evidence of careful planning and a forward-looking policy.

In development of the entire health program, the method of approach will be through and with the coöperation of existing health agencies—federal, state, and local—to the fullest possible extent. For example, the central administrative service of the section includes, as the associate director of the section as a whole, one of the officers of the U. S. Public Health Service, together with a Regional Consultant in county health work, and a sanitary engineer from the same organization. Thus, coöperation is established immediately with the principal federal health agency, and complete coördination is effected. Approach to any local health agency is through the state health organization, and all activity in a given state has as a minimum basis the regulations and policy of that state. In this way, not only is interference and duplication prevented, but also there is actual strengthening of both the existing health agency and the program of the Authority. The wisdom of the policy is illustrated by the fact that not a single major disagreement has arisen with any existing

health agency, despite the rapid growth in organization and activity.

In conclusion, and in illustration of the rapidity with which the activity of the sections has been developed, the growth of the staff may be cited. When this Association held its last meeting, the staff of the section consisted of one individual, the director. Its present budget, exclusive of all coöperative and special studies personnel, consists of 21 medical officers, 3 sanitary engineers, 9 semi-professional persons, and 35 clerical and other employees, or a total staff of 68.

It should be apparent, therefore, that the Authority recognizes the conservation of vital resources as a part of the foundation upon which both social and economic well-being must rest. Indeed, the very language of its basic Act implies this recognition by reference to the "orderly and proper physical, economic, and social development of said areas" and "such studies, experiments, and demonstrations as may be necessary and suitable to that end."

If the Authority, as a collateral result of activity in carrying out its direct and specific responsibility, demonstrates that a reduction in the wastage of vital resources is an economic possibility, then we shall have additional evidence of the value of conserving these resources.

Vitamin D Studies, 1933-1934

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THESE studies comprise the administration of vitamin D (cod liver oil vitamin D concentrate—Zucker process, 1933) in evaporated milk and dairy milk, in varied unitages; also ultra-violet irradiation of the skin.

The children included in the control and experimental groups numbered about 425, boys and girls, aged 8 to 14 years, at four institutions in and near New York City. The institutions are orphanages and are the permanent homes of the children studied. Two of these institutions are conducted on the cottage plan, thereby making it possible to segregate the children for control and experimental management. Each cottage represents a separate group. In the other homes segregation of the study groups was maintained by rigid discipline and a daily program which provided for the time and place of these administrations.

Controls were run as follows: In each institution one group continued on its regular diet and one group received a specified amount of plain evaporated milk (no extra vitamin D). These were the negative controls. The number chosen was large enough so that if the results were negative, or near negative, the number of control observations would be sufficient and so distributed that a maximum of clarity in the results would be obtained. Since in the past irradiation with ultra-violet lamp has given such apparently striking results for several years in succession,

an irradiated group was included to act in a sense as a positive control.

The experimental groups were given vitamin D milk at three different levels of vitamin D. In a pint of reconstituted milk the following levels were given:

100 units daily

150 " "

300 " "

Last year about 150 units daily of vitamin D in fresh milk was given with apparently definite results which, however, were quantitatively not so good as the results with irradiation. In this year's study several groups on 300 units were included to ascertain whether last year's results were due to insufficient dosage. If vitamin D is a large factor in determining the caries incidence, the spacing of 100, 150, and 300 units per day would show either a graduation or else it must probably be concluded that a larger dose is not more beneficial. If vitamin D is not a large factor in caries, or the distribution of caries in children of this age is too irregular to be subject to such observations as were made here, the facts ought to come out clearly due to the large number and distribution of the controls.

However, the groups were also large enough so that if there was a positive result from vitamin D administration, the three levels would give valuable information. Based on previous experience, the three levels were so distributed that they would show a slight, moderate, and rather marked effect. It was

thought better not to attempt this year to evaluate the possible maximum effect but first to verify the indications of previous years.

To make the milk consumption least burdensome for those children who are not fond of milk, and to secure the best results in regularity of intake, the milk (except the fresh milk furnished by the dairy) was slightly flavored with chocolate. Each milk was repeatedly assayed and found to be of the stated potency well within the limit of error to the method.

The unitage given is in the Steenbock units as described in *New and Non-official Remedies*.

Dental examinations of these chil-

dren were made in November, 1933, February, 1934, and the latter part of April, 1934. All three examinations were made and recorded by the same persons during the entire study. The total number of carious tooth surfaces in each mouth at each examination was recorded as the percentage of the total number of tooth surfaces present in each mouth. The differences in these totals indicate the increases in carious surfaces at the end of each period. The differences in the percentage increases indicate the progress of dental caries during the year of study.

The three dental examinations of the year yielded the findings shown in Table I.

TABLE I

COD LIVER OIL VITAMIN D MILK NUTRITIONAL STUDIES
1933-34

Percentage Carious Surfaces for 1st, 2nd, and 3rd Examinations

	150 Unit Evapo- rated Vitamin D Milk			150 Unit Fluid Vitamin D Milk			Plain Evaporated Milk		
	1st	2nd	3rd	1st	2nd	3rd	1st	2nd	3rd
Home A	6.30	7.00	7.38	7.73	8.69	9.51	7.15	8.79	9.47
Home C	7.65	8.40	9.06	6.32	7.00	7.69	5.97	8.49	10.33
Home Z							6.06	8.17	9.51
Home Y							5.21	5.94	7.69
	300 Unit Evapo- rated Vitamin D Milk			100 Unit Evapo- rated Vitamin D Milk			Control Group		
	1st	2nd	3rd	1st	2nd	3rd	1st	2nd	3rd
Home A							6.76	8.63	10.52
Home C							5.74	9.44	11.09
Home Z	5.60	6.39	6.62	5.16	6.70	8.03	5.50	8.28	10.31
Home Y	5.00	5.40	5.50	5.15	5.88	7.46	4.91	7.48	9.06
	Ultra-violet								
	1st	2nd	3rd						
Home Z	5.55	6.58	7.00						

TABLE IA

Home A

Control 23 girls	Plain Evapo- rated Milk 22 boys	150 Unit Evapo- rated Vitamin D Milk 23 boys	150 Unit Fluid Vitamin D Milk 24 girls
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Home C

Control 18 girls	Plain Evapo- rated Milk 26 girls	150 Unit Evapo- rated Vitamin D Milk 24 girls	150 Unit Fluid Vitamin D Milk 28 girls
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Home Z

Control 33 boys	Plain Evapo- rated Milk 28 boys	100 Unit Evapo- rated Vitamin D Milk 28 boys	300 Unit Evapo- rated Vitamin D Milk 30 boys	Ultra-violet Lamp 29 boys
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Home Y

Control 32 girls	Plain Evapo- rated Milk 30 girls	100 Unit Evapo- rated Vitamin D Milk 30 girls	300 Unit Evapo- rated Vitamin D Milk 30 girls
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CONCLUSIONS

1. There is possible a nutritional control of dental caries.

2. Vitamin D is an important factor in the nutritional control of dental caries.

3. Clinical observations point to a probable correlation of the degree of

control of dental caries with the quantitative dosage of vitamin D.

NOTE: The data in the foregoing paper have been extensively analyzed statistically by Professor Earle B. Phelps Professor of Sanitary Engineering, Columbia University, New York, N. Y., and the results have been found significant.

Solution of the Streptococcus Carrier Problem^{*†}

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RESULTS of a 3 year program carried on for the exclusion of streptococcus carriers from the employees of a large dairy industry are presented, with especial reference to the clearing up under treatment of certain throat carriers of this organism.

Of the milk-borne diseases, streptococcal infections have proved the most disastrous, from the standpoints of the number of epidemics and of individuals involved. Septic sore throat has played a prominent rôle in this picture, as shown by Brooks¹ in reporting records of 72 epidemics up to 1932, with evidence of many having passed unrecorded.

In the light of our present knowledge, one must approach a discussion of the epidemiology of either scarlet fever or septic throat with caution; yet developments in the last decade would seem to justify the following conception regarding the latter disease.

While early investigators had reported a hemolytic streptococcus as the causative organism of septic sore throat, Davis² in his study of an extensive epidemic in 1912, was the first to describe what is now known as the *Streptococcus epidemicus*. He found

that this organism exhibited characteristics which distinguished it from the conventional *Streptococcus pyogenes*. Stock strains recovered from previous epidemics conformed to his description, and his findings have been confirmed by Brown, Frost, and Shaw,³ and others.

In view of the fact that probably, with a single exception, all outbreaks of septic sore throat have been traced to milk as their source, later studies by Davis⁴ were of great import since they led to the reasonable conclusion that the dairy cow was not the natural reservoir of *Streptococcus epidemicus* but became infected through contact with human carriers.

As a result of these developments, the American Association of Medical Milk Commissions in 1929 recommended cultural examinations of individual cows in certified herds for the detection of streptococcus carriers, and later advised that measures be taken for the exclusion of possible carriers among dairy employees.

In 1930, the Milk Commission of the Los Angeles County Medical Association adopted the above program to include both employees and animals.

We have employed the technic as outlined by Frost, Gumm, and Thomas,⁵ and amended by Pilot, Hallman, and Davis,⁶ with the exception of dry preparations with Pelikan ink No. 542 for capsule demonstration. We feel this method gives better results than the wet

* Read at a Joint Session of the California Association of Dairy and Milk Inspectors and the Laboratory Section of the American Public Health Association at the Sixty-third Annual Meeting in Pasadena, Calif., September 6, 1934.

† From Department of Experimental Medicine, University of Southern California Medical School.

preparations originally suggested and, in addition, affords permanent records. The addition of the ascitic fluid, as used in the amendment, is very valuable.

The Los Angeles Milk Commission certifies 4 dairies, maintaining more than 3,000 animals with about 250 employees. Monthly cultures of milk from the individual cows have been carried out for more than 4 years and during this period *S. epidemicus* has been found only twice, each time from animals imported from outside the state. Both were in the same dairy but came from different states. Neither animal showed gross evidence of mastitis though both were shedding enormous numbers of typical organisms. They were apparently in the carrier state and would have escaped detection except for the special cultural examinations. The subsequent elimination of these carriers from the herd removed a possible source of an outbreak of streptococcus infection among our consumers as both strains showed a high virulence for mice.

The results of our control program among the employees present an entirely different picture and possibly have some bearing on the low incidence of positives among the animals. Monthly throat cultures of the entire employee personnel, in addition to culture on entrance examination, have been carried out for 41 months. During this period approximately 1,000 employees have been examined, requiring around 12,000 cultures. Fifty of these men have been found to harbor streptococci typical of the Davis organism. An attempt to evaluate the percentage incidence of positives would not give accurate information for general use as the figures represent a single culture in some of the men and repeated cultures in the majority.

As previously reported,⁷ the original survey of the initial group of some 250

men showed a positive incidence of 2.8 per cent. However, 9 per cent positive cultures were found in a study of 66 individuals presenting themselves for tonsillectomy in one of our hospitals where cultures were made from the tonsillar crypts immediately after operation. Pilot, Hallman, and Davis⁸ reported similar findings and emphasized the difference of results according to the care with which cultures were obtained. Experience and care in the technic of taking the throat swabs may have some bearing on our relatively high positive findings of approximately 5 per cent.

All of our carriers gave negative histories of septic sore throat and none showed evidence of acute infection at the time of the positive culture, although some degree of hypertrophy of the tonsils was invariably present. Upon the discovery of the first group of carriers, we were much embarrassed over the responsibility of their disposal, since our health regulations did not recognize either septic sore throat or streptococcus carriers.

Summary discharge would have entailed unjust hardship on the employee and in some cases on the employer. It was also difficult to disregard the responsibility incurred had we released known carriers who might have passed on to uncontrolled raw milk dairies.

Another important factor was the interest shown by our 250 employees in our disposition of these cases, indicating that ultimate success in our program demanded that some effort be made to relieve carriers and restore them to usefulness. As tonsillectomy seemed to offer the only rational and permanent solution, we adopted this measure and met with such success that we have continued it since 1931, in spite of its difficulties and hazards.

Thirty-four, or 68 per cent, of the 50 carriers have been treated in this manner. Of the 16 carriers not operated

upon, the majority refused consent and the remainder were rejected as undesirable applicants for employment or poor physical risks. All cases not operated upon have been reported to the health authorities who have attempted to keep them from working in uncontrolled raw milk dairies.

We have been successful in clearing up the entire group submitting to operation, though not without some difficulty, especially in our earlier experience. Twenty-six, or 85 per cent of the cases were found negative for hemolytic streptococci on the first culture after convalescence and have remained so; 5 failed to give immediate results, the failures being due to incomplete tonsillectomy; to the retention of the organism in the lingual tonsil; or to lymphoid tissue at the base of tongue or in the pharynx. Removal of the tonsil tags and, where possible, the lymphoid tissue, usually brought prompt results; otherwise, local treatment usually with silver nitrate was employed. All of these cases were eventually cleared up.

One of the members of this group, an employee having no contact with cows or milk, was treated by topical applications of chemical germicides, bacteriophage, anti-virus, and even ultra-violet ray. After 3 months' trial without results, the man was returned to the surgeon and under the treatment mentioned became negative.

In the early part of the work, the men were operated upon in clinics or by surgeons of their own choice. This proved unsatisfactory, so arrangements were made to have all tonsillectomies performed by one surgeon familiar with the circumstances under which they were being done. Under this plan, our results have proved much more satisfactory, with few failures in the original operation and a minimum loss of time to the employee.

Apparently these carriers, when once properly cleaned up, remain so

permanently, as shown by monthly cultures. We have records of 6 men for over 3 years, and 8 for more than 2 years. In 1 case the cultures were negative until 4 months after the tonsillectomy, when the organism again appeared. Removal of a small residual mass of lymphoid tissue rendered his throat culture negative and it has continued so for 2 years. This is hardly to be considered an exception.

As to the permanency of the carrier state when once established, we found that 4 men who refused the initial operation and reapplied for employment after periods of 1, 4, 6, and 15 months, respectively, were still positive.

Naturally there comes to mind the question of difficulties encountered with the employees in carrying out a program of this type. Our first problem was the elimination of carriers found in the original group, and second, to prevent entrance of infected men among the numerous replacements. Needless to say, we are unable to force them to undergo operation, and care is taken in each case to impress upon them that the procedure is not compulsory except that otherwise they must retire from employment at certified dairies. They are also impressed with the fact that they must assume all responsibility, and care is taken that they present themselves voluntarily to the surgeon.

Written consent is not obtained as we have been advised this precaution is not a protection. Just how far our precautions protect us from legal responsibility is questionable. However, every possible care is taken of the patient and we feel that so far the end has justified the means. At the start, we encountered considerable difficulty in bringing the men to operation, but with each case successfully handled the morale has increased until at present they accept readily, and in some instances with a certain amount of gratitude our bringing about relief of diseased tonsils.

We have had no accidents or delayed convalescence. One of the first cases passed out of our control and after 2 weeks' delay was operated upon while suffering with an acute throat. He developed a severe postoperative streptococcal angina, complicated by extensive erysipelatous cervical cellulitis. For a time the outcome appeared doubtful but after convalescence of some 2 months, he returned to work and has been with us since. This experience gave us much concern and was one of the reasons we assumed control of the operations.

We wish to express our respect for the opinions of Anna Williams⁹ and others as to the close relationship of the streptococcus of Davis to the organism of scarlet fever. Our experience has been that at times it is difficult to differentiate them, and we admit that some of the strains rejected have possibly been those of scarlet fever. We also have been interested in the character of the so-called capsule of this group. However, in the study of some hundred separate strains recovered at large, we believe it to be a permanent and important characteristic.

So far as can be determined, septic sore throat has never appeared in our community in epidemic form though sporadic cases are occasionally seen which are clinically typical and exhibit the characteristic Davis organism. We have also found pure cultures of *S. epidemicus* in pus obtained from mastoiditis at operation. Of 5 strains of hemolytic streptococci recovered in blood cultures from cases of general sepsis clinically identical, 3 were typical epidemicus, 2 were classified as pyogenes.

SUMMARY AND CONCLUSIONS

Among a group of men required to maintain a personnel of 250 employees,

over a period of 3 years, 50 individuals were demonstrated to be throat carriers of *S. epidemicus*.

Thirty-four submitting to treatment were cleared of the organism and have remained negative under monthly cultural examination.

Among the animals required to maintain combined herds numbering around 3,000, for a period of 4 years, 2 were found with udders infected with *S. epidemicus* without gross evidence of mastitis.

In a community in which an epidemic has never been known, infection with the *S. epidemicus* exists endemically as clinical septic sore throat and extra angular infections, in addition to the carrier state.

Where the beta hemolytic streptococcus has become established in the oropharyngeal cavity, the organism may be found in all of the lymphoid tissues of this area.

This fact is to be borne in mind when tonsillectomy is advised for the relief of focalized throat infections.

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Approval of Laboratories for Surgical Pathology in New York State*

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THE practitioner of medicine today, wherever he may be located—in a medical center or in a rural district—must have laboratory service. From a broad point of view, the administration of public health measures is primarily dependent upon the maintenance of modern standards in the practice of medicine at the bedside, and thus ultimately upon laboratory service. To be effective, laboratory facilities must be readily available and the work entirely dependable. Examinations can usually be performed most efficiently when undertaken promptly after the specimens have been collected. In many cases, also, if a capable laboratory director is so situated that he can see the patient with the attending physician, the best interests of all concerned will be furthered. Thus, the maintenance of adequate standards and decentralization in locally established laboratories, with a supporting supervision—as opposed to a centralized service by a state organization—become issues of primary importance.

Information concerning the manner in which these problems have been met in different parts of the country may be of interest. We are very grateful for the

responses which have been received to inquiries sent to various health departments. The replies have indicated that, in 25 states, arrangements for determining the efficiency of laboratory service have not as yet been made. In 14, supervision of certain phases of the work has been undertaken. The public health laws or other regulations in 5 of the latter group require certain of the diagnostic laboratories to receive official sanction for the conduct of some types of examination. In 2 of these, the technical personnel are provided with certificates showing the kinds of work which they have been found capable of performing. The data furnished thus indicate that the provision which has been made for laboratory service varies markedly in the different states and, for the most part, is limited in scope.

In New York State, the present system of laboratory service dates from the reorganization of the Department of Health approximately 20 years ago, following the revision of the Public Health Law and the appointment of the late Dr. Hermann M. Biggs as Commissioner. The Public Health Council was created at the time of this reorganization. It is without executive or administrative functions, but is authorized to enact a Sanitary Code dealing with any matters affecting the security of life or health in the state (exclusive of

* Read before the Laboratory Section of the American Public Health Association at the Sixty-third Annual Meeting in Pasadena, Calif., September 3, 1934.

the Greater City of New York) and having the force and effect of law. Plans were also inaugurated at that time to broaden the character and scope of the laboratories already serving a few districts and to encourage the establishment of additional ones—all in cooperation with and aided by the central laboratory in Albany—in order that all sections of the state might be provided with an adequate service.¹⁻⁴

The first survey of the laboratories in the state was made in 1915. The ability of the directors and the standards of work varied widely. Thirty-six certificates of approval for a few types of tests for evidence of communicable disease were issued that year to laboratories in which the character of the work warranted such recognition and whose directors were interested in the project. Gradually, more procedures were included and the minimum standards raised. For many years, certain districts, particularly those composed of rural communities, were without easily accessible, adequate laboratory service. This situation was markedly improved in 1923 by the passage of a law granting financial aid from the state, by which under certain conditions it became possible for counties or cities which could not otherwise support an efficient laboratory to equip and maintain one or more.

The number of approved laboratories increased from year to year until in 1934 it has reached 184—129 in which diagnostic service is rendered and 55 in which milk or water examinations only are made. The New York State Association of Public Health Laboratories, formed in 1916, has gradually become an important factor in advancing the standards of laboratory service. It is composed of persons in charge of approved laboratories and those of their assistants who have had adequate training and experience to represent the laboratory. Meetings are held semi-

annually, at which results of experimental work are reported and topics of general interest discussed; cooperative studies have also been successfully conducted.

The steady growth in the extent and character of the service in the state has thus so justified itself that it has had the support of the succeeding political administrations without exception since 1914; and recently under the present commissioner of health, Dr. Parran, the service has been still further extended into the broader field of pathology.

In 1930, Franklin D. Roosevelt, then governor, appointed a commission to advise him in regard to the administrative and legislative aspects of public health in New York State.⁵ Two subcommittees of this commission, one dealing with the control of cancer, the other with the development of laboratory service in particular, reported separately, stressing the importance of an extension of the system of approval—already developed so successfully in the diagnosis of communicable disease—to the examination of tissue and the diagnosis of neoplastic disease.

The laws of the state were amended at the next session of the legislature, to authorize the Public Health Council to establish regulations in the Sanitary Code, prescribing the qualifications of surgical pathologists in laboratories receiving approval by the State Commissioner of Health.

The Code was also amended to provide for the submission to such laboratories of "representative specimens, or sections for microscopic examination, of tissue removed at operation or at necropsy which require laboratory examination as an aid in the diagnosis, prevention, or treatment of disease or to determine the cause of death." These new responsibilities relating to the approval of laboratories for surgical pathology are administered by the Division of Laboratories and Research

in consultation with the State Institute for the Study of Malignant Disease. Histological examinations of tissue specimens have been made in the Division of Laboratories since 1914. The work has always had the helpful support of the State Institute and of Professor James Ewing, consulting pathologist to the laboratory, who, from the beginning, has been deeply interested in developing higher standards of laboratory service in surgical pathology and in the diagnosis of neoplastic disease.

Briefly, the Sanitary Code requires surgical pathologists to be graduates of schools of medicine recognized by the Regents of the University of the State of New York, and licensed to practise medicine, or eligible for examination for license to practise medicine, in the State of New York; it is further required that they have an adequate knowledge of pathology, and, subsequent to graduation, at least 4 years' training and experience in pathological work approved by the Public Health Council, of which at least 1 year shall have been devoted to training and experience in the diagnosis of neoplastic disease: provided, that under special conditions any or all of the qualifications relating to education or experience may be waived by the Public Health Council.*

Approval of laboratories in New York State is entirely voluntary. Nothing in the Public Health Law or Sanitary Code requires a laboratory to become approved. The physician, however, is obligated to submit certain types of specimens to approved laboratories. Thus, very appropriately, the responsibility for having necessary work done in a laboratory that has met adequate standards is placed with the physician who is in charge of the patient.

* The privilege of the waiver has rarely been exercised and only in the case of applicants whose qualifications, while not exactly conforming to the requirements specified, have been fully equivalent to them.

For years, it has been our practice, before issuing approval to a laboratory, to have the director or bacteriologist in charge, provided he is qualified by education and experience, demonstrate his ability by the examination of series of specimens furnished for this purpose. Similarly, candidates now examine a series of sections of tissue representative of the type of material which might be expected from a general surgical service, before approval for surgical pathology is granted. The sections, 50 in number, are accompanied by pertinent information concerning the clinical history, operative and other therapeutic measures. These specimens have previously been studied independently by the pathologists in the Division of Laboratories and Research and those in the State Institute for the Study of Malignant Disease. Only those sections are included concerning which there has been accord in regard to the diagnoses and the suitability of the material for the purpose. Approximately 1,000 such sections are now available.†

The procedure has been to request the candidate to submit data concerning his training and experience and to sign agreements relative to the conduct of the work in the laboratory. Provided his qualifications meet the requirements of the Sanitary Code, he examines a series of the tissue specimens at the State Institute in Buffalo, the central laboratory in Albany, or the branch laboratory in New York City. Also, in a few instances the examination has been conducted at the candidate's own laboratory. Reference books are available if desired. The findings reported are considered by members of the staff

† Arrangements are being made for a museum from which sections of various types of lesions can be lent to directors of approved laboratories for review or special study. A number of pathologists in New York State, as well as in other parts of the country, have already contributed material for this purpose. As soon as the project can be organized fully, we are hoping that the service will be helpful, particularly to the directors of laboratories who do not see a large variety of surgical tissue.

of the Division of Laboratories and Research and the State Institute for the Study of Malignant Disease. If the results of the examination are satisfactory, a certificate effective to the end of the calendar year is issued to the laboratory, a procedure similar to that followed in approval for other phases of laboratory work. The certificate, which is subject to revocation, may be reissued each year, unless the surgical pathologist should sever his connection with the laboratory, or evidence should be obtained that the character of the work is not entirely satisfactory. The surgical pathologist also agrees to return the certificate, should he for any reason no longer be in charge of the work in the laboratory.⁶

On July 1, 1934, 59 laboratories in charge of 41 pathologists had received approval for surgical pathology. Six of these are in New York City, where the State Sanitary Code does not apply. The persons in charge of the laboratories there which have received approval by the State Commissioner of Health, usually have wished to act as consultants to directors of laboratories in other parts of the state. Five surgical pathologists have qualified who have not as yet accepted positions in New York State. As would be expected, almost without exception candidates who have had 4 years of intensive training under com-

petent pathologists and have been actively engaged in this field of medicine have qualified in the practical examination. On the other hand, it has been a most effective means of demonstrating lack of ability in this type of work. Thus far, 19 applicants have failed to qualify. Almost all of them either had not been examining surgical tissue as a routine procedure for a number of years, or their training and experience, while approximating that required, was not entirely satisfactory.

The spirit of coöperation shown by the pathologists in this effort to raise the standards in surgical pathology has been most gratifying. Few question the importance of the service which a well qualified resident surgical pathologist can render. Already the effect of the program on the decentralization of laboratory work for the state has become evident.

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The Industrial Hygiene Section 1914-1934*

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SOME 25 years ago, a few persons, principally physicians but some economists, had appeared in the country who were aroused at the menace of occupational diseases. These began to associate themselves more or less in the subject of industrial hygiene. Now and then for half-a-century past someone had written upon the subject. In 1902, C. F. L. Doehring, a student of George M. Kober's at Washington, made the first official survey of industrial hygiene in America. This was done under the Hon. Carroll D. Wright, Commission of the Department of Labor, and the survey was made in the government shops in Washington. In 1905, Massachusetts was investigating its factories under Dr. William C. Hanson. In February, 1908, Dr. George M. Kober, while Secretary of President Roosevelt's Homes Commission, published a volume upon the subject, *Industrial and Personal Hygiene*. In the same year valuable articles by Dr. George M. Price, Dr. C. T. Graham-Rogers, Dr. Frederick L. Hoffman, and Dr. W. Gilman Thompson began to appear.

In 1910, the Illinois Commission on Occupational Diseases finished its survey under the direction of Dr. Alice Hamilton and the guidance of Prof.

Charles R. Henderson, Dr. Ludvig Hektoen, and others, and in June of the same year the First National Conference on Industrial Diseases met in Chicago at the call of the American Association for Labor Legislation under the guidance of Dr. John B. Andrews, Prof. E. R. Commons, Prof. Henry W. Farnam, and Dr. Henry B. Favill. Also, in New York City in 1910, Dr. Thompson started the first clinic on occupational diseases. This was followed in 1911 by the establishment of another at Rush Medical College, Chicago, by the writer, who had been with the Illinois Commission above mentioned.

Following these activities came those of the U. S. Bureau of Labor Statistics, the U. S. Bureau of Mines, the New York State Factory Investigation Commission (under Price in 1912-1914) and others; also, the impetus given by the XV International Congress on Hygiene and Demography held at Washington in 1912.

Hence, it was not at all surprising that a number of the persons concerned in these activities met at the Jacksonville, Fla., meeting of the American Public Health Association, held in December, 1914, and petitioned for a Section on Industrial Hygiene. This petition was granted and the new Section was the 5th in the list of 10 sections now composing the Association.

A special symposium of 4 papers on industrial hygiene was given at the

* Read before the Industrial Hygiene Section of the American Public Health Association at the Sixty-third Annual Meeting in Pasadena, Calif., September 3, 1934.

Jacksonville meeting, *viz.*, by George M. Kober, E. R. Hayhurst, John B. Andrews, and C. T. Graham-Rogers (in the order presented); and it is a striking fact that all of the following persons read papers in the various sections at that meeting which bore directly upon the subject; C.-E. A. Winslow, J. W. Schereschewsky, John A. Landis, William F. Snow, B. S. Warren, George E. Tucker, Irving Fisher, Philip Jacobs, D. D. Kimball, Earl B. Phelps, G. L. Ruehle, J. W. Trask, George S. Whipple, Slade, Carl Alsberg and Feldman. The following, likewise, took part in the discussions which followed: William A. Evans, Frederick L. Hoffman, Charles J. Hastings, Woods Hutchinson, Eugene L. Fisk, William C. Hanson, Thomas R. Crowder, Frederick S. Lee, Gustave F. Reudiger, Curtis C. Lakeman, Cressy L. Wilbur, Robert Olesen, Louis I. Dublin, James A. Miller, W. S. Rankin, E. L. Thorn-dyke, Roger G. Perkins, Deacon, and Selskar M. Gunn—the last named then Secretary of the Association.

The next Annual Meeting was held at Rochester (1915) where Dr. Kober was appointed temporary chairman who named a nominating committee consisting of George M. Price, J. W. Schereschewsky, C. D. Selby, Gillihan, and Louis I. Harris. The new Section held 4 sessions, and the following presented papers in the order given: J. W. Schereschewsky, George M. Price, C. D. Selby, W. I. Clark, Routsong (of Dayton), E. R. Hayhurst, William F. Snow, Louis I. Dublin, E. L. Fisk, Harry A. Mock, DeLeon, Coleman, Haven Emerson (for Louis I. Harris), W. Gilman Thompson, Kristine Mann (not present but paper read by title and summary), W. H. Rand (not present but paper read by title and summary), G. C. Farnum, A. J. Lanza, C. E. Armstrong, I. M. Rubinow, John B. Andrews, W. D. Yaple (not present), C. T. Graham-Rogers, and Victor C.

Noonan. In addition to those named, discussions of papers were made by George M. Kober, Alice Hamilton, Louis Schwartz, Meyers, Holden, Konrad, Gillihan, C. E. Ford, Theodore B. Sachs, P. S. Platt, S. M. McCurdy, J. M. Woltz, Lee K. Frankel, Victor C. Heiser, V. A. Moore(?), Eugene L. Fisk, W. S. Watkins, John W. Kerr, E. L. Pettibone, George T. Palmer, Brewer, I. A. Lanahan and David L. Rouch.

The first officers of the Section were elected at the third of the four sessions held in Rochester, and were: George M. Kober, *Chairman*; Alice Hamilton, *Vice-chairman*; E. R. Hayhurst, *Secretary*. By common assent and for a number of years the officers succeeded from Secretary to Vice-chairman, to Chairman, and then to Section Member of the Advisory Council which the Association then had.

The names of many not already mentioned were added to membership in 1915, and in 1925 were still on the roster of this Section, *viz.*: Arthur B. Emmons, II, C. C. Elliott, Lloyd Noland, Francis D. Patterson, Alfred E. Shipley, E. C. Jackson, R. W. Corwin, Charles F. Horan, Victor C. Safford, Millard Knowlton, Charles W. Cranshaw, Charles S. Prest, J. T. Black, Easton, Mull, A. J. Orenstein, Anna M. Richardson, D. B. Lowe, J. E. Rush, and C. C. Young.

In 1916, the Section held five sessions at the Cincinnati meeting and added more names well known to us, such as Otto P. Geier, George L. Apfelbach, H. R. M. Landis, Richard A. Feiss, F. E. Deeds, Royal Meeker, and others, and we had many at our sessions who visited from other Sections.

The successive officers of the Section and the annual places of meeting are shown in the table on the next page.

The World War greatly stimulated interest in industrial hygiene, added materially to the membership of the

Year	City	Chairman	Vice-Chairman	Secretary	Councillor
1914	Jacksonville		(Section petitioned for)		
1915	Rochester	Kober	Hamilton	Hayhurst	
1916	Cincinnati	Hamilton	Hayhurst	Price	Kober
1917	Washington	Hayhurst	Price	Schereschewsky	Hamilton
1918	Chicago	Price	Schereschewsky	Patterson	Hayhurst
1919	New Orleans	Schereschewsky	Patterson	Lanza	Price
1920	San Francisco	Patterson (Legge)	Lanza	Winslow (Ford)	Schereschewsky
1921	New York	Lanza (Ford)	Brown	Sawyer	Patterson
1922	Cleveland	Wright	Sawyer	Elliott	Ford
1923	Boston	Hayhurst	Ford	Elliott	
1924	Detroit	Ford (Smyth)	Smyth	Hayhurst	
1925	St. Louis	Smyth	Lanza	Hayhurst	
1926	Buffalo	Crowder	Cheney	Hayhurst	
1927	Cincinnati	Cheney	Fisk	Hayhurst	
1928	Chicago	Fisk	Rector	Hayhurst	
1929	Minneapolis	Rector	Lanza	McCord	
1930	Fort Worth	Lanza	Bricker	McCord	
1931	Montreal	Thompson (L.R.)	Greenburg	McCord	
1932	Washington	Winslow	McCord	Kessler	
1933	Indianapolis	McCord (Sayers)	Sayers (Kessler)	Kessler	
1934	Pasadena	Sayers (Thompson)	Kessler (Gray)	Coleman (Hayhurst)	

Those named in parentheses filled the offices specified, at certain meetings, due to the absence of the elected officers. Section representatives on the Advisory Council were discontinued in 1923. The 3 Section officers are now members of the Governing Council of the Association. In addition, the Section has an advisory committee called the "Section Council" composed of the 3 officers and 5 fellows, 1 of the latter elected each year to serve 5 years. The Section also has 1 representative on the Editorial Staff of the Association and 1 on the Committee on Eligibility.

Section, drew in many medical and welfare directors of industrial establishments, and at the same time saw the formation or extension of other organizations in the field principally associated with the general safety and industrial economic movements. Sheer want of space does not permit the mention of more names well known to us, but the membership was upward of 75-90 persons during this period.

Following the war and perhaps due somewhat to the distant meetings held successively in New Orleans (1919) and San Francisco (1920), a slump occurred both in attendance and interest at the Annual Meetings although probably not afflicting the membership of this Section more than that of others. As a matter of fact, however, the "old guard" withdrew considerably from active participation, due partly to some developing special lines, but fundamentally, I think, for two other reasons explained below. It was not

because at the Annual Meetings the activities of other Sections conflicted directly, as some of us said, with those of the Section on Industrial Hygiene, or to the extending growth of other organizations interested in specializing particular phases of the subject, so that many of us came to belong to several organizations. It was due, first, to the fact that government and convention everywhere were, and still are, devoting time and energies to extending *accommodations* in the shape of rehabilitation and occasionally compensation (not that these things are not laudable), instead of devoting resources to *prevention* and, secondly, because it was difficult to discern the function of the Section any more when it was realized that other public health workers were not looking upon the health of the worker or of the work place as a part of their genuine programs! And why? Plainly because it was and is not yet the "style," and because the laws in practically every

state have placed such health activities largely in other than health departments. In two or three states this has worked out pretty well, but the careful observer knows and sees the results in all the rest. This is the Gordian knot then to be cut in America: Industrial hygiene under other than medical and health supervision.

Public health workers—sanitarians of all descriptions and professions—must get into this “mess”—I know no better word to define it. This is a health matter, not something to be shelved on laymen. Ten years ago, Dr. C. O. Sappington (*Journal of Industrial Hygiene*, VI, 3:94 (July), 1924), of this Section, found that sickness caused 20 times as many cases of absenteeism as accidents, and was responsible for 7 times as much time lost from work, from which it would seem rational that any program for solving the problem of industrial disability intelligently must recognize the health causes while not relaxing vigilance in regard to accident causes. This in itself makes the whole subject worth every physician's and sanitarian's attention. Is organized government, as represented by health or labor departments, doing its duty in this matter? We think not. We will put it stronger—we know it is not, because we have investigated the subject, perhaps ever so superficially, and found that the most unguarded machinery in the entire health field is the health of the worker while on the job.

As evidence of this we have seen the disease, tuberculosis, the great criterion disease of environmental health conditions, recede from 1st to 7th place in the list of causes of death in the general population in the past 20 years, but the recent monograph, “Death Rates and Occupations,” by Jessamine S. Whitney of the National Tuberculosis Association, shows that tuberculosis was the second cause of death among *skilfully occupied males* in

1930, with a rate of 95.1 per 100,000, or next to heart disease. A recent study of Ohio vital statistics showed that, in *mechanical and manufacturing industries*, the tuberculosis death rate for *females* was 118.1 as compared to 96.6 for males, for the year 1929, and that, in 1930, among those so employed, the ratio of female deaths to males was nearly 6 to 1 (*Ohio Health News*, VIII, 19:3 (Oct. 1), 1932).

At the present time the greatest morbidity and mortality is not associated with childhood any more, but with chronic degenerative diseases which appear in adult life, and are particularly rampant in the industrial working classes. Certainly no health program is complete without attention to this serious situation, and I believe no health department is doing its full duty that does not recognize occupational diseases and provide for their reporting and prevention, the same as for communicable diseases, food poisoning, etc.

Our Secretary, B. S. Coleman, informs me we now have 139 members in the Section on Industrial Hygiene, of whom 42 are Fellows, and 97 are full-fledged active members. Furthermore, 16 new applications for Fellowships have been approved for election at this meeting. What better nucleus is needed to consider the facts, policies, scientific aspects, and promotion of a dutiful program in industrial hygiene in this country? To this end we now have 8 standing committees (in addition to the Section Council) which are reporting at this meeting.* Nearly all of these committees were appointed at the Cincinnati meeting in 1927, and nearly all of their respective annual reports

(published, first, in the *American Journal of Public Health*, but since 1930, in the Association's *Year Book*) have gained world-wide recognition as authoritative and unbiased, and representative of the efforts of the best brains the country affords in industrial hygiene. It has also been a great credit to have belonged to any of these committees where hard work was entailed, no funds were available, and most work had to be done by correspondence.

TO WHAT EXTENT HAVE THE MAJOR PROBLEMS OF INDUSTRIAL HYGIENE CHANGED IN THE LAST 20 YEARS?

The average age at death for the industrially employed has advanced by several years, but is still some 6 to 8 years lower than that for those in agricultural pursuits.

Occupational dermatoses are recognized as by far the most widespread of characteristic occupational diseases, and the group of oils, greases, and cutting compounds usually leads, with cleaning agents and petroleum distillates next up.

Lead poisoning maintains the statistical lead as the most costly and no doubt the most prolonged of the disabling occupational diseases, although the incidence of severe cases is lower than formerly. Its diagnosis by refined chemical methods, and the discovery of lead ingestion and secretion in the average individual have been a development of recent years and by members of this Section, notably, Aub and Kehoe. The discovery of lead lines in the long bones by use of the X-ray should be mentioned.

The hazards from spray painting, enameling, lacquering, etc., first recognized in 1915 by an early member of this Section, Dr. R. P. Albaugh, have enormously extended as innumerable poisons have come to be applied by this method.

"Dust phthisis" of 20 years ago, and

"pneumoconiosis," barely mentioned at that time, have gradually contracted down to nearly one great cause producing the disease "silicosis," while the theory of sharp cutting edges has faded out to a more rational mechanical-blockage-and-slow-chemical reaction of some sort. Chest X-rays, first developed as a group-study in 1915 by Lanza (another of our charter members); an extension of animal experiments and the development of dust counts by others of our members; and, unfortunately, costly litigation as a consequence of lack of control, have all come during this period.

Certain disastrous poisons such as benzol, anilin, carbon bisulphide, and carbon monoxide, which were rampant 20 years ago, have largely disappeared as industrial hazards, although some others connected with explosives, "anti-knock" agents, cleaners, solvents, and electro-plating, have taken their places, and we find the names of many of our members attached to these problems, notably Sayers and Yant and their staffs, McCord, Smyth, Phil Drinker, Alice Hamilton, Adelaide Ross Smith—space alone limits naming more.

"Corrosive and toxic agents" are still classified with "flammable agents" in most factory and labor statistics!

Pneumonia has come to be recognized as a potent cause of death among heat exposed workers (under cover), while the administration of common salt in the prevention of heat stroke has been a real discovery.

Radium emanations, lung cancer, and, at least in England, mule spinner's cancer, have appeared as rare but fearful occupational diseases. Indeed, industrial exposures have shown how to produce cancer at will, and may lead to the elimination of this scourge.

Ventilation has developed to the phase of "effective temperature" and "radiation balance," but with very little industrial application, or even com-

mercial recognition, while "air-conditioning," especially for warm weather, is just knocking at industry's door.

Rarefaction has been shown to be essentially an oxygen-want question.

Illumination, especially sufficient illumination, appears to have been satisfactorily solved for most all industrial workers.

Natural methods of resuscitation have all but supplanted the unphysiological mechanical devices of earlier days, while the addition of a stimulating amount of carbon dioxide to oxygen has been an invention of the past decade.

Rehabilitation, including occupational diseases as well as injuries, has come to be a government function in several states, and some of our members, particularly Kessler, have had a leading part in this important matter.

I must also mention that the Section

on Industrial Hygiene has always enjoyed the fullest coöperation of the Editor-in-Chief, Dr. M. P. Ravenel. The vast majority of our papers have been published in the *American Journal of Public Health*, and we have been especially favored with space for abstracts, book reviews, bulletins and reprints.

Finally, the terms "occupational disease" and "industrial hazard" have not yet been standardized or even defined to everyone's satisfaction. A "specific test for fatigue" has not yet been discovered, nor, I might say, a method of correlating a speaker's everlasting dynamics with the increasing weariness of the audience.

In closing, I risk one prophesy only: This Section is going to grow tremendously in influence and membership in the next 20 years.

Use of Dinitrophenol in Nutritional Disorders^{*}

A Critical Survey of Clinical Results[†]

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A LITTLE over a year ago, our first clinical report on dinitrophenol appeared in the *Journal of the American Medical Association*.¹ The interest in and enthusiasm for this product were so great that its widespread use has become a matter of some concern in public health. The total amount of the drug being used is astonishing. For instance, during the past year, the Stanford Clinics have supplied to physicians, or to patients on physicians' prescriptions, over 1,200,000 capsules of dinitrophenol of 0.1 gm. each. Since the usual daily dose is about 3 such capsules and the average duration of treatment about 3 months, this corresponds to 4,500 patients treated with the drug in a year. In addition, upward of 20 wholesale drug firms are marketing the compound, which suggests that a considerable population is being medicated. Probably at least 100,000 persons have been

treated with the drug in this country alone. But this is not all, for reports of its clinical use have also appeared in the medical press of Canada, Great Britain, France, Sweden, Italy, and Australia. Therefore, it appeared timely to summarize the accumulated knowledge of the clinical effects of this drug, and to assess the results critically, in order to determine, if possible, the present status of this new therapeutic agent.

HISTORY

We began to study the actions of alpha dinitrophenol 2-4 first in animals and then in patients, in 1931, being stimulated to do so by the animal experiments of Heymans,² who used a similar compound, namely, dinitronaphthol. Dinitrophenol was not new, since it had been known as a dye for about a hundred years, and as an industrial poison for 32 years.³ There was some interest in its toxicology during the war, due to poisoning in munitions factories. Fundamental investigations of the actions of the compound were made at that time by Magne, Mayer, and collaborators in France, although their studies were not published until 16 years

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later, *i.e.*, in 1932.⁴ Our experimental results⁵ and those of all other investigators are in essential agreement on the remarkable powers of dinitrophenol for augmenting oxidative metabolism by a direct action on the tissues or cells. Prior to our work, there was no indication in any of the published papers that this potent metabolic stimulant might be of any therapeutic usefulness. Therefore, when we first drew attention to the possibility of producing metabolic changes in man with small non-toxic doses of dinitrophenol, there was presented to the medical profession a new tool for use in metabolic disorders.

MEDICAL USES

It has been shown^{1, 6, 7, 34} that dinitrophenol can be used to keep the metabolism at an increased level for prolonged periods of time. An increase in the metabolic rate of about 50 per cent can be maintained in most patients without difficulty, by proper selection of dosage; in fact, greater increases have been repeatedly produced.

Rabinowitch and Fowler¹⁸ state that they have found difficulty in standardizing the oral dose because of individual variability. Examination of their data shows that, when the probable error of clinical metabolic readings is considered, the agreement is as good as could be expected. Variability in sensitivity to drugs of all kinds is a matter of common knowledge, so that, if perfectly reproducible changes were claimed, it would throw doubt on the validity of the observations. In contrast to Rabinowitch, Dunlop⁷ finds a reasonably good agreement between the metabolic stimulation and the size of the dose, which confirms our experience. However, in treating ambulatory patients⁶ it is desirable to proceed conservatively by starting with small doses and increasing them, if necessary, according to the degree of response elicited.

When the drug is taken in adequate

dosage, the increased metabolic activity burns extra fat and carbohydrate and thereby reduces body weight.⁶ It is very interesting that the protein does not seem to be appreciably affected in the combustion process, as indicated by nitrogen excretion. Accordingly, the tissue framework tends to be conserved.^{7, 8, 14} In a preliminary report on the loss of body weight in obese individuals,⁶ it was stated that losses of 2 to 3 pounds a week could be obtained with doses of dinitrophenol which were well tolerated. Three other groups of workers have confirmed this result in smaller groups of patients,^{7, 9, 10} and it is now a common experience with many practising physicians.

Dunlop⁷ compared the relative efficiency of thyroid and dinitrophenol in reducing weight in a few selected patients. He found that thyroid upset the water balance of the body in such a way as to cause at once a rapid loss of weight by dehydration. On the other hand, dinitrophenol reduced the weight less rapidly, but in proportion to the metabolic increase and not by an effect on water balance. His experimental results do not satisfactorily establish his conclusion that "even in maximum therapeutic doses it (dinitrophenol) does not compare, as a weight reducer, with thyroid"; since he used both drugs for only a few days at a time, and during these periods the weight changes were so small as to be readily accounted for by shifts in the water balance.

The amount of permanent weight change that can be produced by dehydration in non-edematous patients is not great enough to be important where any significant amount of weight is to be lost. If this were not the case, simple dehydration procedures would answer the needs of this difficult clinical problem. Therefore, it appears to us that, before the therapeutic efficiencies of these drugs may be satisfactorily

compared, it is necessary to make observations over long periods of time, during which more than a few pounds are lost. It has been indicated by us in several publications^{11, 12} that dinitrophenol cannot be used to replace thyroid secretion. It is therefore misleading to compare the intensities of their actions since they act so differently qualitatively.

Since dinitrophenol can increase the tissue metabolism by a direct action on the cells, without producing the side-actions which accompany metabolic stimulation by thyroid, it offers, theoretically at least, interesting possible applications in medicine, besides its use in obesity. For instance, there have been reported interesting effects in psychiatric conditions,^{13, 14} and failure to relieve myxedema,^{7, 15} and many other studies are in progress. Because of its widespread and probably sometimes indiscriminate use by large numbers of people, it is pertinent to consider possible harmful effects from the compound.

FATAL EFFECTS

In experimental animals, a large enough dose of dinitrophenol will stimulate the heat production to the point where fatal fever results. The heat production may be increased 1,200 per cent, the body temperature increasing 0.2° C. per minute. Under these conditions, death is caused by heat rigor, that is, by heat-coagulation of tissues. Exactly similar effects can be produced in man provided a large enough dose is taken. This was seen occasionally in munition workers during the World War, who absorbed large amounts of dinitrophenol through the lungs or skin.

The first case of fatal poisoning from the therapeutic use of the drug was that of a physician who took a tremendous dose on two separate occasions, with the alleged object of treating an

imaginary syphilitic infection.¹⁵ In his second administration, he took 5 gm. of the drug as a single dose, which is a 17 day supply for most patients. A fatal fever resulted, with death in 12 hours.

The second death was a girl who bought the drug on her own responsibility from a druggist. On the fourth day of medication, she took 0.8 gm., which caused a fatal pyrexia.¹⁶ Since the daily dose during the first week or two should be only 0.1 gm.,⁶ it is obvious that this girl took a very excessive dose. In fact, it was a larger dose than we have ever used therapeutically, even after months of continuous medication.

The third death occurred in a psychiatric patient who was receiving doses within the therapeutic range.¹³ The clinical history of this patient's illness and death is completely at variance with the known actions of dinitrophenol, since there was a protracted course of illness and an absence of serious fever. Also, the autopsy and clinical studies were so incomplete as to preclude a correct diagnosis of the cause of death.

These three cases represent the reported fatalities from dinitrophenol. If the third case be excluded because of the question as to the true cause of the death, it is seen that neither of the other two cases was due to the use of the drug in the usual therapeutic doses. When one considers that some one hundred thousand patients have been treated with this exceedingly potent therapeutic agent, it is a matter of some gratification to know that fatalities have not been more numerous. It might be added in this connection that fatalities from the fever of dinitrophenol can be largely prevented, in animals at least, by chilling the skin with ice packs and by giving oxygen inhalations.¹⁷

There are also a number of observed, or theoretically possible, deleterious actions, which do not result fatally. These may be discussed according to the

organs involved, *i.e.*, skin, liver, kidneys, circulation, and gastrointestinal tract.

SKIN REACTIONS

In a series of 113 obese individuals,⁶ we observed the presence of skin rashes in about 7 per cent of cases. The rashes consisted of maculo-papular dermatitis, urticaria, or angio-neurotic-like swellings of the skin, accompanied by pruritus and occasionally by desquamation. There was usually a prodrome of itching before the skin lesions developed. Four similar cases have been reported to date,^{9, 19, 20, 21} and many more than these have undoubtedly occurred. Dintenfass²² has recorded still another case in which the dermatitis was associated with congestion of the middle ear.

The inference might possibly be drawn from certain reports that a Derrien reaction with the urine could be used as a means of predicting possible lack of tolerance to the drug. This idea rests on a misunderstanding of the nature of the test; it is merely the well known diazo reaction, which is positive in the presence of amino-nitrophenols. Hence, it only indicates that dinitrophenol has been absorbed in the body and has appeared in the urine in a reduced form. During the war, this reaction was used solely as a means of identifying those workers whose exposure resulted in appreciable absorption of the drug.²³ Bolliger has recently cast doubt on the value of the reaction for even this purpose.²⁴

Another possible way of predicting dermal intolerance is by the usual allergic skin tests. Frumess²⁵ states that, in a case of urticaria, he was able to reproduce the skin-sensitivity by passive transfer. However, an extensive series of skin tests²⁵ in patients with and without skin rashes, who received dinitrophenol therapeutically, has failed to bring out any evidence that skin-

sensitivity can be detected by patch, scratch, or intradermal wheal tests. Passive transfer tests were also negative. These methods would therefore seem unpromising as means of selecting patients for dinitrophenol medication.

Since the skin rashes may be very unpleasant or alarming in some cases, they constitute the main disadvantage in the therapeutic use of dinitrophenol. A saving feature, however, is that about half the patients who have had one skin reaction are able, after a short interval, to resume the medication without further difficulty.

LIVER DAMAGE

Much has been made by some editorial writers and clinical reporters of the possibility that dinitrophenol might damage the liver. This has been based mainly on reasoning by analogy from picric acid and other compounds. Since the dinitrophenol has a yellow color, which imparts an icteric tint to the blood plasma, it may be mistaken for the bile pigments of jaundice.²⁶ The differentiation from the latter may be readily made by adding dilute hydrochloric acid to the plasma which decolorizes the dye. In one patient suspected of liver injury, Rabinowitch¹⁹ found only a slight increase in the bilirubin in the blood and no change in the urobilinogen. At the next examination of this patient, the findings were all negative. Another case where liver injury was apparently produced has been recently reported by Sidel.²⁴

We have seen no evidences of damage to the liver in our clinical cases,⁶ and at this time we may add more extensive data on this question. In 17 patients who were given an average of 0.3 gm. of sodium dinitrophenol daily for from 1 to 5 months, there were made 22 determinations of the icteric indices of their acidified blood plasmas. The average value was 8.2 units with a range of from 4.8 to 16.3. Fourteen

determinations on non-medicated patients gave an average index of 7.6, with a range of from 4.2 to 10.0. In 45 patients, the bilirubin content of the blood serum was determined by the van den Bergh reaction.⁴ This group of patients received an average daily dose of 0.3 gm. (range 0.1 to 0.6 gm.) for an average period of 19 weeks (range 2 to 50 weeks). The average total amount of the drug taken was 36 gm., with a range of from 2.8 to 122.5 gm. In these patients, the bilirubin averaged 0.29 units, with a range of from 0.13 to 0.79 units. Only 2 patients of the 45 showed values over 0.5, but these had no demonstrable clinical evidence of liver disturbance.

If the dinitrophenol injured the liver progressively, it might be expected that the bilirubin of the blood would increase with the total amount of the drug taken. The following tabulation shows that no such increase was present, which further supports the conclusion that damage to the liver was not produced in these patients.

<i>Average total amount of dinitro- phenol taken in gm.</i>	<i>Number of cases</i>	<i>Bilirubin units (average)</i>
0 - 10.0	12	0.27
10.1- 30.0	8	0.34
30.1- 40.0	14	0.32
40.1- 80.0	8	0.22
80.1-122.5	4	0.31

The van den Bergh reaction was repeated in 6 patients some time after stoppage of the dinitrophenol medication. These patients had been off the drug for an average of 36 weeks when they showed an average bilirubin content of 0.24 units (range 0.15 to 0.40). Accordingly, there was no evidence of delayed liver damage.

It has been observed by us¹⁵ and by Poole and Haining¹⁶ that, in fatal dinitrophenol poisoning, destructive

changes may occur in the liver as well as in other viscera. It must be remembered that death in these cases was accompanied by a very high fever, which in itself is enough to account for the morphological changes observed in the liver cells. The usual therapeutic doses of the drug produce no change in body temperature and also no evidences of change in liver function. However, the possibility must still be left open that in occasional patients an idiosyncrasy may exist which might mediate damages to the liver.

KIDNEY

If dinitrophenol in therapeutic doses damaged the kidneys, this would be manifested by albuminuria and related changes. Such evidences could scarcely go undiscovered, since urinalysis is such a common routine procedure. Hence, it becomes of significance that only 1 possible case of renal injury has been reported thus far. Rabinowitch and Fowler¹⁷ reported 1 patient who developed an albuminuria and high blood urea during dinitrophenol medication. Three weeks later, the urine, and the blood urea and creatinine were all normal. In our patients⁶ albuminuria has never been produced by the drug, but on the contrary a limited number of patients have lost their preëxisting albuminurias during the medication. Our experimental studies^{27, 30} on animals have also shown the drug to be quite devoid of toxic effects on the kidneys. Therefore, the possibility of renal damage would appear so remote as to cause little or no concern in the therapeutic use of the drug.

CIRCULATION

One of the most striking features of the metabolic stimulation of dinitrophenol is a lack of significant changes in blood pressure or pulse rate, unless therapeutic doses are exceeded.^{1, 6} That is, the metabolism may be increased by

* The van den Bergh data were obtained with the assistance of Elizabeth Hines.

as much as 50 per cent without demonstrable changes in circulatory activity. This phenomenon is in striking contrast to the effects of thyroid administration, where circulatory changes are a marked feature of the symptom-complex. Confirmation of this early finding has been given by Looney and Hoskins,¹⁴ Rabinowitch,¹⁸ and Dunlop,⁷ and more recently again by ourselves working under different conditions.²⁸ We have observed that, when a patient feels very hot and flushed, there is a rise in venous pressure. This may be the result of vasodilatation in the skin rather than the metabolic stimulation, since the venous pressure changes do not correlate with those of metabolism. Rosenblum²⁵ observed in patients whose metabolic rates were increased 37 per cent by dinitrophenol, that the circulation time from the arm to the tongue was unchanged. This would be in keeping with the lack of changes in the blood pressure and pulse rate previously reported.

Masserman and Goldsmith¹³ have made the rather startling claim that 5 out of their 18 psychiatric patients showed toxic effects characterized by a fall of blood pressure, tachycardia, stupor, etc. No such effects were observed by Looney and Hoskins¹⁴ in a similar group of patients, nor in upward of 300 non-psychotic patients observed by us. Not a single case of hypotension has been observed by, or reported to, us and none has been reported in the literature. The unconfirmed and possibly misinterpreted observations of circulatory changes by Masserman and Goldsmith, taken together with an unexplained death among their patients, suggests that there may have been some error in the therapeutic procedures they used, such as the possible use of a wrong isomer or an impure preparation of dinitrophenol.

Patients who have hypertension can be medicated with dinitrophenol like

other patients. As they lose weight, the hypertension is usually improved⁶ and the associated symptoms are ameliorated.

BLOOD

In studying the possibility that dinitrophenol might affect the blood, both the red and white corpuscles must be considered. Thus far we have not made extensive red cell counts in patients receiving dinitrophenol, but there have been no evidences of anemia, even after months of medication. The oxygen capacity of the blood of 15 patients was determined for possible evidences of injury to the respiratory function of the blood. Since the normal oxygen capacity of the blood varies from 18 to 21 vols. per cent and in these medicated patients the average value was 19.5 vols. per cent with a range of from 18 to 22 per cent, there is no reason to believe that the blood was injured. These patients received an average of 0.3 gm. sodium dinitrophenol daily, for an average period of 6 weeks. The addition of sodium dinitrophenol, in concentrated solution to several specimens of blood did not change the oxygen capacity. Therefore, the drug does not appear to affect the hemoglobin of the blood *in vitro* and *in vivo*.

Study was also made of the fragility of the red cells of these same patients to determine whether there was any increased tendency of the cells to hemolyze. The cells were exposed to various strengths of hypotonic salt solution and the concentrations at which hemolysis began and was complete were noted.²⁹ Hemolysis of normal cells begins at from 0.46 to 0.38 per cent concentration and is complete at from 0.34 to 0.25 per cent. With the cells of the medicated patients, the hemolysis began at an average of 0.44 per cent, with a range of from 0.42 to 0.46 per cent, and was complete at an average of

0.31 per cent, with a range from 0.25 to 0.38 per cent. Since these values were all within the normal range, there was no evidence of alteration in fragility of the red cells.

Current emphasis on the problem of agranulocytosis makes it desirable to observe the white blood cells in patients receiving dinitrophenol. We have seen no cases of malignant neutropenia, or of any condition which might be ascribed to a reduction in the number of white blood cells, among the considerable number of patients treated at Stanford. In addition, we have examined the blood and bone marrow of dogs given extra-therapeutic doses of dinitrophenol daily for 6 months without finding any abnormalities.³⁰ However, Hoffman, Butt, and Hickey³¹ have reported 1 patient who developed a neutropenia while taking dinitrophenol, and who recovered. A second case has recently been reported,³⁶ and other unpublished cases have apparently occurred.³³ Agranulocytosis has been reported in association with medication with a large number of unrelated drugs, and even in the absence of medication. Although the cause of agranulocytosis is not yet understood, it is probable that the underlying factor common to all cases is a defective bone-marrow which requires some, and apparently sometimes a relatively insignificant, exciting cause to precipitate the crisis. Given such bone-marrow, it is conceivable that many extraneous agents, physical, bacterial or chemical, and including even dinitrophenol, might initiate the clinical syndrome. The fact is that the vast majority of patients can take massive doses of the various drugs alleged to cause agranulocytosis without damage to white cells, and yet in a sensitive individual even a small therapeutic dose of one of these drugs may suffice to precipitate the condition. However this may be, we shall continue to examine all patients receiving dinitrophenol with

the possibility of agranulocytosis in mind, and hope to present more specific data on the question at some future time.

GASTROINTESTINAL TRACT

Heymans has stated that dinitrophenol causes very severe gastroenteritis and loss of appetite, and suggested that the loss of weight was due to the failure or inability of the patient to eat.³² In our very large series of patients, there have been only 3 cases with digestive complaints during the medication with dinitrophenol. These complaints lasted only for a few days, such as might be expected from a slight dietary indiscretion. The claim that this drug is a severe irritant to the gastrointestinal tract of patients is unwarranted for doses of therapeutic range, according to our experience and to that of large numbers of physicians prescribing it. Tissues from the gastrointestinal tracts of dogs given the drug for 6 months by mouth also showed no evidences of abnormal changes.³⁰ Therefore, there is no good reason for postulating a hypothetical gastroenteritis as the cause of the loss of body weight in the face of repeatedly demonstrated metabolic stimulation which does adequately account for it.

DISCUSSION AND SUMMARY

It can now be said that dinitrophenol is of definite value as a drug for treating obesity and perhaps some other metabolic disorders. In the hands of the medical profession, it can be used with the maximum benefit and with minimum deleterious results. Unfortunately, its sale cannot be confined to physicians under present legal regulations. As a result, it can be, and is being, sold in patent and proprietary medicines under names which do not reveal its presence. A person buying such an anti-fat remedy over the drug store counter, with no more directions

as to its use, or warning of possible harmful effects, than the manufacturer pleases to put on the label, may run a serious danger of doing himself harm. This problem is particularly pressing since "obesity cures" are extensively bought by fat people for self-medication without diagnosis. Therefore, it would seem desirable that dinitrophenol be added to the poison list, and its sale regulated so it could not be obtained except on a physician's prescription.

In the first enthusiasm for a new drug, which has spectacular actions, it is to be expected that it may be used somewhat too freely. This we have consistently tried to prevent in the case of dinitrophenol by stressing the potential dangers of the compound when used indiscriminately. Certainly, it should not be used as a routine measure in any clinical condition. Obesity can be controlled in most cases by the physician who will patiently supervise the dietary regime. In other cases, thyroid or thyroxine may be needed. It is only when all other measures have been thoroughly tried and found ineffective, and when there is impelling need for weight reduction, that dinitrophenol medication, with a knowledge of attending risks, should be undertaken. Under these circumstances, the physician must balance the prospective benefit against the potential harm, just as he does with any therapeutic procedure, and give the patient his best chance.

This summary of the clinical effects and side actions of dinitrophenol shows that in some respects this drug is not ideal as a therapeutic agent, since it may cause certain undesired side-actions in a portion of the patients treated. However, this does not mean that it cannot be used safely under proper conditions. Investigations are under way in our own and many other laboratories to develop new compounds which may be better than this original or parent substance. It would be only a matter of chance, if

dinitrophenol happened to be better than any substitute that could subsequently be prepared. Therefore, it may be expected that the next few years will see other compounds brought forward and advocated. Perhaps some one of them may supplant alpha dinitrophenol as the agent of choice. However, this will in no way affect the great significance of dinitrophenol as having been the first foreign agent, or drug, to be demonstrated as a very potent and well nigh universal metabolic stimulant, which was available for experimental purposes and useful for alleviation of human infirmity.

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Concurrent Immunizations

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ON December 11, 1933, I did 100 Schick tests on grammar and pre-school children who had received immunizing injections of diphtheria toxoid without previous Schick tests, and on reading them 3 days later found 91 were Schick negative. We were surprised at this result, as the individuals had been given toxin-antitoxin in 1930 and the toxoid in 1931 and 1932. The immunizing agents had been carried, unrefrigerated, over a hot desert for 96 miles, and therefore could not have been of the highest efficiency. After reading the Schick tests with this percentage of immunity, we looked to our sterilization and to the dosage of the Schick material, and could find no fault in either.

The next day we went to a settlement 114 miles from the Unit, where the same condition of giving immunizing injections for diphtheria obtained, and on reading the Schick tests found practically the same percentage negative.

In checking the inoculations given these 2 groups of school and preschool children, we found that they had been given simultaneous immunizations of toxin-antitoxin or toxoid with typhoid vaccine, and in many instances a smallpox vaccination had been done at the time of the primary injection. Later in checking our records we selected a group of 180 grammar school children in Miami and 350 school and preschool children in Hayden, who had had concurrent immunizing injections of diphtheria toxoid with typhoid-paratyphoid vaccine and smallpox vaccination, but

without previous Schick tests, and the percentage of Schick negative children ran the same. We therefore Schick-tested 3,000 children, most of the group being of grammar school age, who had had the diphtheria inoculations from 1 to 3 years previously but without Schick testing, with the result that the entire group who had received concurrent immunizing inoculations showed 90.7 per cent immunity. In this series we had watched sterilization carefully. The heated toxoid was carried and kept in thermos jugs that were properly iced so that the Schick control material would be properly refrigerated at all times. Pains were taken to see that each child got exactly 0.1 c.c. of the fluid in an intradermal injection. Faults in technic where the skin was penetrated have not been counted in this series. Where such faults occurred, however, the children were given the Schick test at the time of the readings of the other children in this group, and were then read 3 days after the original reading.

We found from records of the diphtheria immunizations in Gila County, that from 1930 to the end of the first half of 1933, 90 per cent had received simultaneous immunizing injections of the toxoid and the typhoid-paratyphoid vaccine. This was due largely, I believe, to the distance a former director and nurse were compelled to travel in order to immunize the school children, as it is 114 miles from the office of the Gila County Health Unit to the most northern school in the county, and 50

miles to the most southern. For this reason time was an element in the giving of immunizations, although the same conditions obtained in the schools at Globe, where the office is located, and at Miami only 6 miles away.

While we have done considerable Schick testing in children who did not receive concurrent immunizations, the percentage of those Schick negative has not yet been tabulated, our efforts having been spent in checking those Schick tests where concurrent immunizations had been given, and in those individuals where the alum precipitated toxoid was used.

The ages of those included in the 3,000 tests vary from 1 year to 12 years. In other words, the group con-

sisted of children who received the immunizing injections between the age of 6 months and 9 years. The highest percentage of Schick positive children was in the 8-10 year old group. The greatest percentage of Schick negative children who had received concurrent immunizations, was in the 1-5 year period.

Tabulations have not been made for age groups of the elapsed time from the primary injections to the Schick tests.

As there is little, if any, mention in the literature as to the higher immunity percentage found where concurrent inoculations are made, it seemed fitting to make this report of the 3,000 Schick tests made from December 11, 1933, to June 30, 1934.

Relapsing Fever Problem of California*

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STATISTICS concerning the incidence of relapsing fever in California (39 cases of which 16 were unproven by blood examination), its clinical features as well as a general discussion of the epidemiology, have recently been given by Briggs.¹ Aside from the work at the Hooper Foundation, University of California, as far as I know there has been no detailed study made of the California strains isolated from human cases and wild animals. My results, to a considerable extent, with discussions of the work and opinions of numerous authors throughout the world, have been embodied in 4 articles already published. In this paper I will review some of my outstanding conclusions regarding the California strains thus far studied.

In general I may say that the morphological characteristics of the spirochete do not give us any criteria for the differentiation of species. The clinical disease in mice caused by the 8 California strains which I² have studied was practically identical in each except that some strains proved to be more virulent than others. As to the disease in guinea pigs there seems to be considerable difference in the clinical picture and in the individual susceptibility of these animals. While spirochetes are usually present, in certain

animals the cardiac blood examined in thick film every day for 22 to 23 days after inoculation never revealed spirochetes, though it was infectious for mice. The serum of these particular guinea pigs with cryptic infections was not protective for mice. The controls receiving serum alone were not infected. The blood had been centrifugalized at high speed for 3 hours and the serum kept in the ice box for 2 weeks.

The entire life cycle of relapsing fever spirochetes has not yet been revealed. The question of dosage required to infect animals and the stage of the disease at which the inoculum is taken is still of considerable importance. In my hands "negative blood" when infectious generally produces a mild disease. Studying Texas strains Kemp, Moursund, and Wright³ found that a small dose of negative blood produced positive results earlier and a more pronounced infection than larger amounts. It would have been interesting to have destroyed the viability of the invisible forms and to have made an attempt to evaluate the protective properties of the serum. Most other workers, as far as I know, have attributed different antigenic properties to the spirochetes of the various phases of the disease. As regards the dosage, in all this work to evaluate the comparative infectivity of spirochetes from different stages of the disease, consideration should be given to the presence or absence of spontaneous agglutination in the inoculum and the number of spirochetes present.

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For this purpose only washed spirochetes should be used.

Novy and Knapp⁴ and Kemp, Moursund, and Wright³ believe that the viability of blood kept *in vitro* depends upon the phase of the disease from which it was taken, relapse spirochetes dying out rapidly. These workers respectively kept blood 40 and 6 days. Gray⁵ did not find onset blood kept at 0° C. or at room temperature infectious for 40 days. While I have not kept whole blood as taken from the animal I² have added a few drops of whole uncitrated mouse blood (first relapse) to about 6 c.c. of defibrinated sheep's blood and placed it in the ice box. The blood has remained infectious for over 5 months. It is now our practice in carrying on our strains, in order to save time and animals, to inoculate mice from sheep blood every 2 or 3 weeks and place the onset blood from the infected mouse in fresh sheep's blood.

The California strains are infectious when fed to mice and by the conjunctival route in guinea pigs. I have been unable to affect the normal increase of spirochetes in the blood of mice at onset of the disease by the injection of the serum of hyperimmunized mice. This is contrary to the experience of Novy and Knapp.⁴

IMMUNITY

Passive immunity frequently can be conferred by the injection of homologous serums even of "recovered" mice if given several hours before the spirochetes while heterologous hyperimmune serum may protect if the spirochetes are added to it or if the serum is injected separately by the intraperitoneal route at the same time. In testing for active immunity with either homologous or heterologous strains, contrary to the opinion of most workers, it appears to make no difference from what phase of the disease the spirochetes for the test are taken. As to onset and first relapse

spirochetes, Kemp, Moursund, and Wright³ have confirmed my⁶ findings that there is cross-immunity between them. It is interesting to note that these authors have produced active immunity in white rats by intraperitoneal injections of heat killed spirochetes.

In my earlier work with 3 California strains I⁶ found that all were probably identical, and studied in comparison with *Sp. novyi* and *Sp. duttoni* I showed that 3 mice hyperimmunized (10 injections) with a California strain were protected against 4 injections of *Sp. novyi* (onset and relapse spirochetes). Mice less solidly immunized with *Sp. novyi*, which when received was less virulent than this particular California strain, were not protected against it. I then discussed the history of *Sp. novyi*, the findings of St. John and Bates⁷ in comparing it with the Panama strains and the possibility of a close relationship between it and the California strains.

In later work I⁸ showed that the serum of a "recovered" guinea pig very mildly infected by the conjunctival route with a Texas (Fall Creek) strain gave absolute protection to 3 mice inoculated with a Central California (Lake Tahoe) strain and marked partial protection against more virulent strains from Southern and Northern California. This tends to confirm the opinion several times expressed that certain Texas and California strains are probably identical. In the same paper I have discussed in detail the technic and sources of error in cross-immunity tests. Their correct application depends upon the determination as accurately as possible of the degree and duration of the immunity to the homologous strain of the immunized animals at the time they are to be tested and the *relative virulence* for the same animal species of the 2 strains to be tested against each other. In testing "recovered" or hyperimmunized mice against a heterologous

strain, aside from the usual normal controls it is well to inoculate 2 mice of the same series of "recovered" or hyper-immunized animals again with the homologous strain as additional controls.

Experience has shown that sometimes at a given point immunity diminishes very rapidly. When occasionally rare spirochetes of the heterologous strain appear after inoculation, showing incomplete immunity, one can thus sometimes form an opinion as to the probability that there was not absolute immunity at the time of the test to the strain with which the animals were immunized. This may occur even though a preliminary test with a large dose of the homologous strain 10-15 days before the heterologous test showed complete immunity. However, the results obtained in cross-immunity work are mainly a question of dosage, standardized if possible, for each organism. With a rigorous technic one can control to a considerable extent the many complicated factors and show relationships which could not be put in evidence by haphazard methods. As for the 8 California strains studied, judged by cross-immunity tests, all appear to be related to each other, some very closely, and some others, originating in areas about 450 miles apart, are undoubtedly identical. Only 1 strain at the time it came into my hands was markedly less virulent than the others.

The literature on the differentiation of species of spirochetes is too voluminous to review in this paper. The cytologic methods with immune serums apparently show differences to exist between strains which by the methods of passive or cross-immunity appear to be identical. The value of cross-immunity tests as a criterion of species relationship or identity, due to the variable results obtained by different workers and the inherent difficulties encountered, is seriously questioned by many.

Nicolle and Anderson⁹ believe that, because of the tendency of each spirochetal strain to individualize, there are no distinct species, and that this notion should be eliminated. On the other hand, the "pluralists," while admitting this tendency toward individualization as regards certain strains, believe that they do not go to the point of identity in all respects and therefore that species do exist. Nicolle and Anderson have given their criteria for the separation of the spirochetes of relapsing fever into groups giving less importance to the vector than to other characteristics. They state that the vector "is purely geographic and therefore fortuitous." This idea is not shared by Brumpt¹⁰ who believes that their identification should depend upon their transmission by the different species of vector. He was unable to transmit the Texas strains by any tick species tested other than *O. turicata* and conversely that *O. turicata* did not transmit experimentally by biting, *Sp. duttoni*, *Sp. venezuelensis*, nor *Sp. hispanicum*. He has, therefore, named the Texas strains and, provisionally, those of California, "*Spirochaeta turicatae* n. sp." This would seem, perhaps, rather premature, given the fact that *O. moubata* is capable of transmitting at least 5 spirochetal species and that most of these latter may be transmitted by 2 other tick species. The ability to transmit in nature and the adaptability of all the American ticks and other arthropods to the Texas and California strains have not been studied. While Kemp, Moursund, and Wright¹¹ have shown a strict adaptation between Texas strains and *O. turicata* they find that *Sp. novyi* is not transmitted in the laboratory by this tick. They¹² had previously shown by cytologic tests and the Pfeiffer phenomenon that *Sp. novyi* is identical with the Texas strains. They therefore consider that these latter do not constitute a new

species. They believe that "more stress could and should be placed on the serum tests, when these tests are made on solidly hyperimmunized animals, rather than on the specificity of the vector." I apologize if I have encroached upon the prerogatives of the epidemiologists in discussing this question before this section. My excuse is that the elucidation of the problem of the relationship between the American strains is so inextricably dependent upon results obtained in the laboratory.

I submit that we have a right to consider the results of the various workers and their conclusions in a critical spirit. Aside from the sources of error in maintaining spirochetal strains in a state of purity, it is well to remember the dictum of Nicolle and Anderson¹³ that "No invertebrate . . . can be considered as the transmitting agent of a disease if one has not recognized and demonstrated by what mechanism it transmits it in nature." That certain arthropods may or may not be shown in the laboratory to infect by biting does not necessarily prove that they are or are not the *usual* transmitters in nature, though they may or may not be. Likewise the infectiousness of emulsions of any given arthropod does not prove it to be in nature a vector of the disease by biting, though it may be.

The possibility or probability that biting insects other than lice and ticks may by adaptation become specific vectors is dependent upon ecological and other biological factors and the subject should elicit greater interest. Further work should be undertaken with California rodent fleas, as I am not yet convinced that my own infection may not have been due to these arthropods. The fact that my assistant was very ill with night sweats, chills, and high fever (blood not examined as he complained of bronchial symptoms), at the same time as my own infection is not without significance. We had both been

autopsying squirrels teeming with fleas and were severely bitten during 3 days. However, none of the animals, all of which were adults, proved to be infected with spirochetes.

CARRIER CONDITION

Whether the persistence of viable forms of spirochetes in the body and particularly in the brain of "recovered" animals is productive of a continual reinforcement of immune bodies has been a subject of much controversy. Kritchewski¹⁴ claims that neurotropic as distinct from somatropic races of spirochetes exist. Levaditi, Anderson, *et al.*^{15, 16} have shown that these persistent forms, generally invisible, cause lesions in the brain which have more than one analogy with those due to the neurotropic syphilitic virus. Their "encéphalite récurrentielle" began as early as 48 to 96 hours after the injection of *Sp. duttoni*. I² have already described the brain lesions of mice which had hemiplegia or other symptoms which might have been attributable to the injection of relapsing fever spirochetes. Though the relapsing fever therapy for general paralysis shows that no immunity exists in these cases I used several human serums showing a positive Wassermann reaction in protection experiments in mice against some California strains of relapsing fever. The results were all negative.

Authors differ as to whether spirochetes can be found in the brain when the blood is not infectious. Delanoë¹⁷ working with *Sp. hispanica* has stated that in the course of the disease the brain may be infectious but that this is never so unless the blood is also virulent. I⁸ have found this to be the case with California strains in all my experiments to determine this question.

Reactivation of latent infections—Some investigators claim that the antibodies of the blood stream present an

impenetrable barrier to the invasion of these forms, visible or invisible, which may be latent in the brain, bone-marrow or elsewhere in the body. Several workers, by the injection of *Trypanosoma brucei*, have reported the reappearance of spirochetes in the blood stream, in some cases as late as 5 months after the original infection. I¹⁸ have never been able by means of intercurrent infections, or typhoid, or other vaccines to obtain reinfections in recovered mice.

There is considerable doubt in my mind as to whether the carrier condition in this disease may be a source of great danger to man. However, we should not lose sight of the possibility of reactivation in the blood stream from various causes of those visible or invisible spirochetal forms which may have undergone little if any attenuation during the short period they may have remained in the bone-marrow or brain. A cryptic or abortive infection of the blood stream might result which, due to the presence of susceptible ectoparasites, might constitute a source of danger. Stitt¹⁹ is of the opinion that because second attacks in man usually do not produce relapses or sometimes even symptoms, such cases may become an ideal source of infection with lice or ticks. As a matter of fact, spirochetes have been found in the blood of man for very extended periods after "recovery" from infection (45 days in Madagascar and recently 5 months in San Francisco). Immunity in man, however, is apparently of short duration, Todd²⁰ having reported 2 natural infections in the same individual in a single winter. My own serum had no protective properties 8 months after my infection. It is fortunate that the urine, unlike the blood, does not constitute a source of danger in relapsing fever.

Golden Mantle ground squirrels (*Callospermophilus chrysodeirus*, *chrysodeirus* (Merriam))—Donkeys, horses,

sheep, goats, foxes, jackals, and some other wild animals, have cryptic infections. Many other species are found in nature to be infected. Of the squirrels and chipmunks surveyed in California no spirochetes have been isolated from the Golden Mantle ground squirrel (Dorothy Beck, personal communication). I¹⁸ made exhaustive studies of 5 adults of this species 1 month after capture. In none of them at various intervals was the blood infectious nor did the serum protect mice against the virulent strains with which I experimented. Many attempts to infect them with large doses by the conjunctival and intraperitoneal routes combined failed. Neither before (1 animal) nor after inoculation was the brain infectious. After inoculation the serums failed to protect mice against the strains inoculated. Whether these mature animals had an acquired immunity I do not know, but the study of the young of this species in the spring is indicated.*

As man is only an accidental host in California where massive louse infections do not exist, the subject of the carrier state, aside possibly from that in wild rodents, is only of academic interest.

COMMENT

Considering the presence in the Sierras of several species of ticks known to be vectors elsewhere of relapsing fever, that the transmission of spirochetes in ticks appears to be hereditary (Texas strains by *O. turicata*, Brumpt) and the widespread rodent reservoirs of the virus in our forests, the eradication of relapsing fever in California is well nigh hopeless. A blood examination should be made in all cases of fever of unknown etiology, especially if the patient had been in the mountains.

* Several workers have failed to demonstrate antibodies in the sera of patients subsequently proved by inoculation to be immune, and the sera of certain individual adult guinea pigs which were resistant to our strains did not protect mice nor contain other immune bodies.

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Safety Speakers' Bureau

THE Metropolitan Chapter of the American Society of Safety Engineers, 29 West 39th Street, New York, announces the organization of a Speakers' Bureau consisting of 50 authori-

ties on accident prevention at work, on the street, and in the home. Speakers will be available without charge to industrial plants, schools, service clubs, women's organizations and other groups.

STANDING ORDERS FOR NURSE-TEACHERS

Associate Editor's Note: Since Dr. Wilson's Standing Orders for his school nurses at Evansville, Ind., was mentioned in the Nursing Section Notes (p. 80) of this *Journal* in January, 1934, a number of inquiries have come to the Associate Editor and Dr. Wilson from school men, school physicians, and health officers in widely separated parts of this country and Canada asking for copies of these Standing Orders.

Foreword by Charles C. Wilson, M.D., formerly Director of Health and Physical Education, Board of Education, Evansville, Ind., now serving in a similar capacity in Hartford, Conn.

"The health and physical education program in the public schools of Evansville, Ind., is a coördinated program of health service, physical education and health education. The entire program is under the Board of Education. As part of the health service program 5 nurse-teachers and 1 supervisory nurse-teacher are employed. This is in the proportion of 1 nurse-teacher to 2,500 pupils. The title nurse-teacher is used to emphasize the fact that an important function of the phase of the program is teaching. The nurse-teacher is really a teacher with nursing training. Her function is to use every possible procedure to further the education of pupils, parents, and teachers in the field of health and the prevention of sickness. The supervisor of nurse-teachers in Evansville is Florence Roller, R.N. The following are the Regulations and Standing Orders for nurse-teachers prepared by Miss Roller and approved by me."

I. Arrival at School

A Upon arrival at school the nurse-teacher shall first sign the time book in

the principal's office. (The nurse-teacher shall make every effort to be at the school according to schedule and shall inform the principal, if possible, when unable to be there on time. If work at another school necessitates a change in schedule, that should be arranged for with the principal and the supervisor.)

B. Time for home visits may be taken from the school period scheduled when indicated.

II. Duties of Nurse-Teacher

A. At school clinic

1. A definite signal, arranged for by the principal, shall be used to announce to the teachers that the nurse-teacher is ready for clinic. At this time all children needing health care shall be sent to the room assigned for this purpose. Each case should be made educational and the children should be taught and encouraged to give first aid when possible. The nurse-teacher inspects the children, gives advice or treatment, takes a temperature when indicated, or recommends exclusion. She should give the teacher any necessary information concerning the child. Be sure that teacher and principal clearly understand the purpose of your clinic.

2. Keeps First Aid Cabinet in order and well supplied.

3. Have some one responsible for materials when nurse is not present.

B. Assisting doctors with physical examinations

1. Previous to examinations, vision and hearing should be tested and recorded on health cards. The date, age, grade, height, and present weight should also be filled in.

2. Be responsible for letters sent out urging parents to be present at time of examinations.

3. Assist with clinical work at time of examination as necessary. You may interview parents concerning correction of defects, etc., may give vision or hearing tests, verify weight record, etc., for benefit of parents.

4. Endeavor to make the examinations as private as possible. Also see that children are undressed to waist for examination.

5. Notify parents of findings and recommendations made during physical examination.

a. Give slip to parent at time of examination.

b. Send notices home as soon as possible after examination.

c. Home visits, if possible, made to homes of all children with defects, whose parents are not present at examination. Make home visit on all cases with heart or lung condition marked 2 or 3 the same day examination is made.

d. Make out Health Score Charts for teachers following the examination.

e. Tabulate the results of examinations for each school and make reports to supervisor.

C. Work with parents

1. Coöperate with P. T. A. as much as possible by keeping them informed as to the work being done in the school and giving information and reports to Health Chairman.

2. Circumstances permitting, urge parents to call at school for consultations concerning their children's health.

D. Home visits

1. Each home visit should be purposeful and educational, not only for the individual but for the family as a whole. Keep your relations with the family on a friendly basis even though you do not accomplish your objective.

a. Explain the need and urge correction of physical defects.

b. Make arrangements for such corrections as must be made through the free or partially pay service.

c. Investigate known cases of illness where no medical care is being given. Arrange for medical and nursing care to be given, if needed.

d. Make post-operative visits where nurse-teacher has arranged for operation.

e. Learn home conditions of children and secure parents' coöperation.

f. Make an investigation of any case of tuberculosis, contact or suspect.

g. Give necessary demonstrations of:

Ventilation of sleeping room

Shampoo

Gargling

Proper cleansing of ear

Dressing or compress

Treatment for pediculosis, impetigo, scabies

E. Make routine room inspections when indicated

1. For communicable disease, pediculi, etc., instruct the teachers in method of inspection and encourage them to give the daily room inspection. The inspection may be conducted as follows: The nurse explains to the teachers her reason for visiting the room. She stands with her back to a window. The children pass before her about 2 feet apart, giving her an opportunity to observe their condition. Instruct pupils to show the palms and back of hands with fingers spread and sleeves pushed up as far as possible. Lift hair showing ear and scalp behind ears, also forehead. Draw down their lower eye lids, throw back their heads so that edges of nostrils may be seen, open mouth so that throat may be examined (individual tongue depressors used when necessary). The nurse-teacher should avoid handling children but should ask the teacher to take the names of any children whom she wishes to have examined more closely. After finishing inspection, these children should be cared for individually in the clinic.

2. Exclusions—The nurse-teacher shall, in the absence of the physician, recommend the exclusion of any pupil who, in her judgment, shows signs or symptoms of a communicable disease. If the principal desires, she shall make out the exclusion blank in duplicate, giving one to the child and filing the other in the office. She should notify the Board of Health of any suspicious reportable disease. Date of re-admittance should be entered on stub of exclusion book when child returns. (Principal should appoint some one to care for these matters in nurse's absence.)

F. When special examination of a child is indicated, leave with the school clerk the following information: Child's name, school, grade, teacher's name, and reason for examination.

SUPPLIES FOR SCHOOL FIRST AID
CABINETS

Alcohol 70%
 Tr. iodine 3½%
 Mercurochrome 2%
 Oil of cloves
 Vaseline
 Zn. oxide ointment
 Ammoniated mercury 2%
 Tr. green soap
 Aromatic spirits of ammonia
 2 in. gauze bandages
 1 in. gauze bandages
 Roll adhesive
 Sterile gauze roll
 Cotton
 Toothpicks
 Thermometer
 Scissors
 Needles
 Paper bags for waste
 Eye chart
 Communicable disease chart

STANDING ORDERS FOR USE OF SUPPLIES

Refer cases to family physician when in your judgment his care is needed. *Nurse-teacher must not assume responsibility for the care of infections.* Application of drugs should be made with toothpick cotton swab or cotton pledget, fresh ones used for each application. Dressings showing good home care should not be removed if in good condition unless the nurse feels it is for the best interest of the child. Apply sterile dressings as needed but use as economically as possible. Use a piece of sterile gauze to cover injury and use roller bandage to hold in place unless adhesive will serve the purpose equally well.

NOTE: All dressings, applicators, tongue depressors must be well wrapped in paper before being put in waste paper basket.

In case of serious injury make every effort to get in touch with family as they should take the responsibility for securing medical service. Give simple first aid until physician is secured or family takes child over.

Fetus and Ringworm—Scrub with tincture of green soap, paint with tincture of iodine. The next day and each day until healed, apply 2 per cent ammoniated mercury ointment.

Impetigo—Remove crusts with tr. of green soap, apply 2 per cent ammoniated mercury.

Bandage if possible. Exclude cases which might endanger others. Give parents printed slip outlining treatment, if parents are unable to obtain medical advice.

Discharging Ears—Cleanse only. Swab with cotton.

Pediculosis—Exclude until following day all children having live pediculi. Those with nits only may remain in school if nurse is satisfied that condition is being properly treated. Follow up with home visit if necessary to get condition corrected. Give parents printed slip outlining treatment.

Scabies—Exclude for 3 days. If case is neglected, make a home visit to secure correction. If family is unable to care for it, give printed slip of instructions.

Cuts or Scratches—Swab with tr. of iodine or mercurochrome.

Cold Sores—Apply zinc oxide.

Poison Ivy—Zinc ointment dressing.

Burns—Apply vaseline lightly. Bandage as necessary.

Boils—Apply sterile gauze dressing. Spread lightly with vaseline.

Dog Bites—Let bleed freely. Apply sterile dressing. Report name and address of person bitten. Report name and address of dog's owner to Board of Health. Use influence to have dog secured *alive* for examination.

Toothache—Apply oil of cloves with cotton on toothpick.

Earache—Urge care by family doctor.

Foreign Substance in Eye—Use small cotton swab moistened in clean water or flush eye with boric solution, using cotton pledget.

Splinters—Use forceps or needle sterilized in alcohol. (Clean with green soap and alcohol before putting away.)

Care of Thermometer—Rinse with water before putting in mouth. After removing, wipe with cotton, wash with green soap, scrubbing vigorously, wipe with cotton, scrub with alcohol and dry before replacing in case.

The above suggestions for care are offered for use in those cases where children show signs of neglect. The above suggestion should not be carried out in any case where the parents are receiving or are able to obtain medical care. Urge home care. Treat neglected cases only. First aid treatment for accidents and injuries occurring at school is the function of the nurse-teacher. Treatment of other conditions is a responsibility of the parents and the family physician.

Current Mortality Releases*

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THE records centralized in the various bureaus of vital statistics are valuable in proportion to the use which is made of them. The universal policy has been to emphasize the importance of the records as legal documents and for the preparation of statistical tabulations which are usually old. This paper is not intended to minimize the legal or statistical value of the records but rather to point out another very important use which is sometimes overlooked—the first-aid which they may give to health workers in checking epidemics and arresting deaths from preventable causes.

There has been an unnecessary loss of human life due to procrastination or negligence in disseminating promptly the information available in the various vital statistics departments. The U. S. Bureau of the Census furnishes current releases for various states and weekly releases for 69 cities. The U. S. Public Health Service publishes weekly current releases not only for the United States but also for foreign countries. This material is of tremendous value and provides the health worker a picture of what has taken place. These releases and others which are too numerous to mention have their place and provide a very necessary and valuable part of the public health program. The major part of the material in the releases to which I have just

referred originated in the offices of the registration executives and while the information is important to the state and to the United States in observing what has already happened, there appears to be entirely overlooked the use that may first be made by local or smaller units.

Morbidity reports, if complete, are of much more value in epidemiological work than are the mortality records. In most states, however, morbidity reports are very incomplete, and warnings of epidemics are often first discovered through the mortality records. The state registration executive, therefore, has a definite responsibility and an important part in cooperating with health officials.

In efficient state registration, the first prerequisite is to have a very close working basis with the state health officer or state commissioner of health. The vital statistics department is not faithfully performing its duty until the state health officer has been informed currently of what is happening in the state as pictured by the vital statistics records. Some states wait for the U. S. Bureau of the Census tabulations before they really know what has happened within their own boundaries. In many other instances, the tabulations are made annually by the states or current releases given quarterly and semi-annually in tabular form by city or county units. This is not real cooperation with the state health officer.

In many states, the vital statistics department does not receive sufficient appropriation, is not rated in importance

* Read before the Vital Statistics Section of the American Public Health Association at the Sixty-third Annual Meeting in Pasadena, Calif., September 3, 1934.

with other departments of the state board of health, but is rather considered just a bookkeeping department. This under-rating of a vital statistics department is largely the fault of the registration executive himself. The volume of routine work necessary to build a vital statistics department and keep it going very often brings those in charge so close to their task that they overlook entirely a wonderful opportunity to give out information promptly that will contribute a real and important asset in the hands of the health officials for stamping out epidemics and curtailing the loss of life from preventable causes.

It is not enough to inform the state health officer as to the number of deaths in the state or in a county from a preventable cause or from a group of preventable causes. He needs more definite information for quick action. For example, Escambia County, Fla., had an unusually large number of deaths from typhoid fever for a number of years. Statistical tables showing the number of deaths from this cause, by counties, had been published at various times but the high average for this particular county as compared with other counties did not receive attention. A spot map was, therefore, prepared indicating the exact location in the county of each death from typhoid fever and the information was placed in the hands of the state health officer who, in turn, directed an investigation to be made immediately. The result was very gratifying. For a decade, there had been an average of 10 deaths a year from typhoid fever in this particular county. The year after the investigation was completed and the source of infection discovered, there were only 3 deaths from typhoid fever in the entire county, and so far this year not a single death.

It was found many years ago that Taylor County, Fla., which is in a malaria district, had the highest death rate from this cause of any county in

the state. From 1919 to 1929 there was an average of 15 deaths annually. An anti-malaria campaign was undertaken by the State Board of Health, with the coöperation of the U. S. Public Health Service, and later a regular county health unit put into operation. The result was spectacular in that there has been an average of only 5 deaths from malaria in that county during the past 4 years, which more than justified the expenditure of time and money.

It is only natural that a state registration executive should often be tempted to neglect the study of current data in order to do the more spectacular or pleasant work. Workers in counties having well organized health programs, with few deaths from preventable causes, are making a real contribution to their citizens, with little praise or commendation. On the other hand, the county to which I have just referred is talked about all over the state for the wonderful work and splendid results accomplished. There is very little comment made about a railroad company which has introduced block signals and other important equipment for the prevention of railroad accidents. When a railroad wreck occurs and the engineer performs some unusual heroic feat, his name is in the headlines of every paper because he took a personal risk in order to save the lives of his passengers. If the train service had been efficient enough to prevent the accident, the passengers would have slept in their berths, the train would have arrived at its destination, and the results taken for granted. This, in a way, illustrates the difference between the spectacular results obtained from research work in vital statistics and the control of preventable deaths by the prompt use of information taken from current releases.

Little reference has been made in this paper to current releases as an index for the health worker as their value is

accepted without question. Those who have first access to original data have a real responsibility. Prompt action is necessary for the control of epidemics. The records received in a bureau of

vital statistics are carrier-pigeons bringing advance information. A dove carrying a sprig of foliage may not attract particular attention but Noah in his Ark grasped the import of its message.

Certified Milk in Two Pennsylvania Counties

MORE than 2,000 samples of certified milk were examined during the 10-year period from 1923 to 1932 by the milk control laboratory serving 9 suburban boroughs and first class townships near Philadelphia in Montgomery and Delaware Counties, Pa.

In an elaborate statistical analysis of the data on these samples, which were distributed uniformly by months and fairly so by years, a number of interesting facts are brought out. Ninety per cent of the samples were found to contain not over 10,000 colonies of bacteria per c.c., and those exceeding the standard were most numerous in the summer months. Ninety-five per cent of the samples

showed the standard butter fat content of 3.5 per cent or more, although out of the total of 2,248 samples one had 7.3 per cent, and another 13.0 per cent butter fat. Only a few of these milks revealed skimming or the presence of visible dirt.

The author points out what is recognized by health officials, that while most certified milks are consistently of excellent sanitary quality, some are occasionally below standard. He does not, however, indicate how many farms, or what individual farms, may have been responsible for lowering the general average of excellence.—David Wilbur Horn. *A Survey of Certified Milks. Hahnemannian Month.*, June, 1934.

Endemic Typhus

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AND

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THE world-wide distribution of the various forms of typhus fever with its increasing incidence in various countries is causing more and more attention to be directed toward this disease. During 1933 large numbers of cases were reported from Asia, Africa, the United States, Peru, Mexico, the Baikan States, Portugal, Poland,

fatality rate is of negligible importance in the United States. Occasionally it appears among immigrants, but it has never gained a permanent foothold here. On the other hand, Brill's disease or endemic typhus has shown a marked increase in our Southern States during the past 2 years.

From Table I it will be seen that the

TABLE I
TYPHUS FEVER INCIDENCE IN SOUTHERN STATES
1928-1933

	1928	1929	1930	1931	1932	1933
Florida	0	48	39	28	42	54
Georgia	48	57	134	127	308	625
Alabama	59	72	67	80	237	823
Louisiana	0	1	0	1	17	11
Texas	5	8	13	43	227	398

and Lithuania. According to the *Medical Officer*,¹ Great Britain, France, Germany, and New Zealand are the only countries which escaped typhus during the early months of 1933.

Old-world typhus with its high

morbidity rates for Alabama, Georgia, and Texas have been especially high in 1932 and 1933. The number of cases in Louisiana and Florida has been small, and in Mississippi very few have been reported. For 1932 and 1933 Egypt

TABLE II
INCIDENCE OF TYPHUS FEVER

	1928	1929	1930	1931	1932	1933
Egypt ¹	599	1,141	288	265	2,298	7,839
Union of South Africa	1,436	1,778	1,347	1,663	1,664	2,288 (To Nov. 25)
Mexico*	516	741	894	1,684	1,246	989 (6 months)
United States	196	239	510	374	892	1,668
Poland	2,401	1,988	1,640	2,154	2,283	2,842
Rumania	983	1,456	1,857	1,419	1,788	1,871

¹From the *Epidemiological Report*, Health Section League of Nations
* Deaths.

had more than its normal number of cases, and in Poland and in the Balkan States typhus has been rapidly increasing since 1931. Table II gives some idea of the incidence of this disease for the past 6 years in various countries.

EPIDEMIOLOGY

From earliest times epidemic typhus has been closely connected with filth and human misery. It has been called jail fever, ship fever, and famine fever. Wherever the standard of living has been materially lowered, typhus has almost invariably made its appearance, and this obvious connection had caused many speculations concerning its etiology and method of conveyance.

Otto² (1909) from observations made among army troops believed that vermin acted as vectors. Nicolle, Comte, and Conseil³ (1909) proved that the body louse could transmit epidemic typhus among experimental animals. Soon their work was confirmed by Ricketts and Wilder⁴ (1910), Anderson and Goldberger⁵ (1912), da Rocha Lima⁶ (1916), and others. Since then it has been demonstrated that the spread of epidemic typhus may be prevented if the louse is destroyed. Epidemiological data show that outbreaks are most common in the late winter and early spring when louse infestation is the highest.

In 1898 Brill⁷ recognized in the United States a type of fever which, resembling typhoid, gave a negative Widal reaction. He^{8,9} demonstrated its similarity to typhus, but showed that it was milder and less contagious, only one case as a rule being found in a household. He reported that it was most prevalent during the fall instead of late winter or spring. In 1912, Anderson and Goldberger¹⁰ proved that Brill's disease was immunologically identical with Mexican typhus or tabardillo. Naturally this led to the belief that it was louse-borne.

Maxcy¹¹ (1926) in an extensive epidemiological study of Brill's disease or endemic typhus was at a loss to explain its non-contagious character and its seasonal incidence if he assumed that the louse was the vector. Since he noticed that a larger number of cases appeared among persons handling food-stuffs, he was inclined to believe that rats and mice might be the reservoirs and that the disease was carried to man by fleas, mites or ticks. He emphasized the fact that Brill's disease shows no preference for the lower strata of society and bears no relation to lousiness. The next step was taken when Dyer, Rumreich, and Badger¹² (1931) were able to recover the virus of Brill's disease from rat fleas which had been found in typhus foci.

Rumreich¹³ (1933) has pointed out that until 1931 ". . . there was, in spite of Maxcy's fundamental work, much confusion in regard to the probable vector of endemic typhus, and a variety of insects and arachnids were suspected by different workers. Among these vectors were the tropical rat mite, common North American chigger, the body louse, the head louse, the Anopheles mosquito, the bed-bug and the tick. It is now obvious that much of this chaos was due to the fact that two distinct clinical entities were being confused, and for this reason Maxcy's observations were not more widely accepted." The work of Rumreich, Dyer, and Badger¹⁴ (1931) definitely proved that there are in Eastern and Southern United States 2 diseases which are related both etiologically and serologically. One of these is endemic typhus which is transmitted to man by the rat flea; the other is Rocky Mountain spotted fever which is carried by the tick. Although ticks may be infected by intrarectal injection of the typhus virus, the fact remains that, as Dyer¹⁵ (1933) states, "the isolation of spotted fever cases from the true typhus group

TABLE III
SEASONAL DISTRIBUTION OF CASES
Alabama, 1926-1933

	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1926	4	1	1	2	3	3	1	5	7	7	4	10
1927	6	1	2	1	1	5	9	7	14	7	8	3
1928	1	2	1	0	0	7	9	12	13	2	4	3
1929	0	3	4	5	4	7	4	11	11	5	12	6
1930	1	2	1	0	6	5	3	11	19	10	6	3
1931	3	2	1	6	1	4	7	12	5	15	13	11
1932	6	3	5	12	9	29	17	26	51	48	17	14
1933	11	8	16	15	39	79	153	129	147	75	92	59
Total	32	22	31	41	63	139	203	213	267	169	156	119

removed all epidemiological evidence that the tick was acting as a vector of typhus fever in the country."

ENDEMIC TYPHUS IN ALABAMA

Typhus fever was first recognized in Alabama in 1922 when a series of cases giving a positive Weil-Felix Reaction were reported by Maxcy and Havens.¹⁶ From that time until 1932 cases continued to be reported—60 to 80 cases each year. The disease has been confined almost exclusively to South and Southeast Alabama, with certain localities showing cases year after year. In 1932 there was a very sharp increase in incidence—237 cases with 11 deaths as

compared to 80 cases and 4 deaths the preceding year. This increase continued during 1933 when the cases reached 823 and the deaths 35. From the urban centers the disease spread and much of the incidence is now in purely rural areas and among people who could not have obtained their infection except at home. Association with food establishments is still an important factor in urban cases.

The seasonal occurrence has remained constant during all this time with the summer and fall months accounting for most of the cases. This is contrary to the experience with the epidemic type of the disease.

TABLE IV
DISTRIBUTION OF 1,029 CASES OF TYPHUS FEVER BY RACE, SEX, AND AGE
Alabama, 1932-1933

Age	White		Colored		Total	
	Male	Female	Male	Female	Male	Female
0-4 years	4	10	0	0	4	10
5-9 "	20	15	1	1	21	16
10-14 "	43	31	2	2	45	33
15-19 "	67	24	3	0	70	24
20-24 "	46	26	1	4	47	30
25-34 "	105	51	10	11	115	62
35-44 "	117	52	7	3	124	55
45-54 "	74	46	8	4	82	50
55-64 "	42	20	4	2	46	22
65-74 "	21	11	0	1	21	12
75 and over	3	2	0	0	3	2
Not Stated	66	56	9	4	75	60
Total	655	344	45	32	653	376

Race, Sex, and Age—Maxcy¹¹ called attention to the relative freedom of the negro from the infection. This holds true, but not to the same extent, since there have been 77 cases reported among colored in the past 2 years. In the 21 counties most concerned the negro population is 45 per cent of the total so that the attack rate among them is only one-tenth that of the white. Males continue to predominate particularly among the whites, and adults are most affected. With the extension of the disease into rural areas, and with the infection being acquired at home, more women and children are being exposed. Table IV shows the distribution of 1,029 cases reported during 1932 and 1933 in which race, sex, and age were given.

Diagnosis—These cases were seen by a number of physicians, but the clinical appearance was sufficiently characteristic in most instances to be readily recognized. During 1933 the laboratories of the State Health Department examined 1,445 specimens of which 461 were positive for the Weil-Felix Reaction, while an additional 81 were classed as doubtful. This compares with 149 positive tests in 1932, 63 in 1931, and 61 in 1930.

Fatality—During 1932 and 1933 there were reported 46 deaths from typhus fever. Based on 1,060 cases re-

ported for these years, this is a case fatality rate of 4.3 per cent, an annual death rate of 0.84 per 100,000 population. This fatality was lower than that for cases reported prior to this period. In the 498 cases reported in 1922-1931, inclusive, there were 38 deaths, a fatality rate of 7.6 per cent. No doubt, the morbidity was reported more completely during the last 2 years and this is a partial explanation of the decrease in the fatality rate. It is apparent that there has been no increase in the fatality with the increased incidence.

Whereas, 73 per cent of the cases in Alabama during the last 2 years were under 45 years of age, only 35 per cent of the deaths occurred in this age period. As shown in Table V, the fatality rate varied greatly with age, being less than 2 per cent for cases under 45 years; 5 to 7 per cent between the ages of 45 and 64 years, and approximately 30 per cent for persons above 65 years of age.

These conclusions are based on the fatality rate for white cases, in so far as the number of colored cases, by age, was too small to warrant analysis. The fatality rate for the colored cases was 11.7 against 3.8 for whites. That the higher fatality rate for negroes may be due, to a considerable extent, to less complete recognition and registration of cases for this group is possible.

TABLE V
CASE FATALITY, TYPHUS FEVER, ALABAMA
(Based on 1,029 Cases)
1932-1933

	Cases *				Deaths				Deaths per 100 Cases			
	White		Colored		White		Colored		White		Colored	
	M	F	M	F	M	F	M	F	M	F	M	F
0-14 years	75	67	4	4	1	1	1	..	1.3	1.5	(a)	..
15-44 years	376	183	26	20	7	2	4	..	1.9	1.1	(a)	..
45-64 years	130	79	15	7	9	4	1	2	6.9	5.1	(a)	(a)
65 years and over	27	15	0	1	8	5	1	..	29.6	33.3	(a)	..
All ages	608	344	45	32	25	12	7	2	4.1	3.5	15.5	6.3

* Unspecified Ages Distributed

(a) Number of cases too small to make significant rates

It should be noted that when 2 or more causes are given on the death certificate typhus fever is preferred over all other causes except cholera, plague, yellow fever, and deaths from violence. A study of the death certificates for these deaths reveals that on only 11 was typhus fever the only cause given. The most frequent contributory cause was pneumonia, in 14 instances; nephritis in 9; myocarditis in 6; apoplexy in 4; and all other causes, 8. In some instances more than one of these conditions were also noted on the death certificate. A contributing factor to this higher fatality in the higher ages is the fact that these persons were already suffering from a chronic heart or nephritis condition which would have made them poor risks for any infectious disease. In uncomplicated cases the case fatality for endemic typhus is low.

Control—During the past 2 years the disease reached such proportions that it became a serious public health problem. The definite incrimination of rats and rat-fleas as sources of infection naturally pointed to rat destruction as the most feasible means of attack. The area of Alabama most seriously infected corresponds roughly to the peanut growing area so that the rat population was probably large. Nearly all homes visited reported manifest rat infestation. During 1933 many of the towns in the area concerned inaugurated rat control programs—combining poisoning and trapping in most instances. With the inauguration of the CWA work program a larger, widespread program superseded the local efforts and a serious attempt at rat destruction was undertaken in some 21 counties. It is estimated by the Biological Survey that almost 4,000,000 rats were destroyed in this project which closed with the discontinuance of the Civil Works Administration program.

It is too early to determine the effect this wholesale slaughter will have on the

typhus incidence during 1934, but the early months of the year have not shown the expected incidence.

At present studies are being conducted as to other possible reservoirs of infection in nature, but the rat is probably the greatest offender. Eradication is almost impossible, but continued effort will materially lessen his menace to the health of the people.

DISCUSSION

Endemic typhus fever, or Brill's disease, has during the past 2 years become a serious problem in Alabama and some other southern states. From foci in certain cities the disease has spread to rural areas and is now widespread.

The original observations of Maxcy as to race, sex, age, and seasonal distribution have been largely confirmed.

The case fatality rate for uncomplicated endemic typhus is low. Much of the mortality is in the older age groups. There has not been an increase in case mortality rates with the increasing morbidity.

The work of Maxcy¹¹ and of Dyer, Rumreich, and Badger¹² has shown that the reservoir of infection is in the rat and that transmission is by the rat-flea. The mild winter climate, plentiful food supply, and absence of rat-proofing in buildings are all conducive to heavy rat infestation.

An attempt at control of typhus in man through rat eradication was carried out during the early months of 1934 with the effects still to be determined.

Evidently typhus fever has secured a firm foothold in Alabama and is going to require a continuous control program.

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Hop-Picking

AS the occupation is healthy, and financially is reasonably recompensed, there is a holiday element in it which appeals to the city dwellers. If the summer is warm and comparatively dry, it is a real outing for the East End Londoners, but if it is wet the immigration is shorn of much of its attractiveness for, even under the most favorable weather conditions, the health authorities find it extremely difficult to house the invaders, notwithstanding the large number of permanent corrugated iron camps which are dotted all over the areas. In South West Kent alone, and here I borrow my figures from Dr. Galbraith's reports, there are 386 hop farms with 11,548 huts to accommodate the 67,000 pickers who arrive every summer. In many of the camps it is more or less a gipsy life which is led, but pure water is carried into all the camps both for drinking needs and hygienic

requirements; the cleaning of camps and the removal of litter have to be attended to, but, despite all efforts, overcrowding is a blot on the family and social life of the camps. . . . One consequence of handling the hops, or as the result of friction of the skin against the catkins and leaves of the plant is the occurrence of an inflammation of the skin. The dermatitis, or "hop rash" as it is called, and due to an irritant evolved from the plant, is mostly observed on the arms. The inflammation may affect the eyes, giving rise to "hoppers' eye," or there occurs what is called "hoppers' gout," an inflammation of joints or a synovitis mainly of the wrists, and probably caused by the repeated and fatiguing movements of the joints in picking.—Sir Thomas Oliver. Disease and Disaster Traceable to Vegetable Sources. *J. State Med.*, July, 1934, pp. 421-422.

EDITORIAL SECTION

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THE PASADENA MEETING

THE 63rd Annual Meeting of the Association will go down in history as one of the most successful ever held. It will be remembered that the special reason for selecting California this year was because it was the 5th anniversary of the foundation of our Western Branch, and our meeting was a con-joint one with that organization. Every arrangement possible was made for our accommodation, entertainment, and pleasure. The hospitality of the people of California was unbounded, and here in the name of the Association we wish to express to our hosts our appreciation.

The scientific sessions were well thought out; there were excellent programs; and attendance was very good. It may be invidious to select certain features, and we possibly would not do so except for the interest of the entire Western Coast as well as throughout the country in the epidemic of poliomyelitis. We had a session devoted entirely to the consideration of the outbreak of this disease in California generally, and Southern California particularly. Every seat in the vast room was filled.

Another notable feature was the session of the Western Branch at which Dr. Walter H. Brown was inducted as president. All the members of the parent organization were invited to attend. It was a dinner session and every seat was well filled, it being necessary to bring in extra tables. The first General Session, on Monday night, at which the President's address was given, was one of the largest meetings, not only of this session but of any session which the writer remembers. This was held in the Main Hall of the Civic Auditorium, a magnificent amphitheater, in which the acoustics were really remarkable. The speakers could be clearly heard in the most remote seats, a feature we would like to recommend widely to the architects of buildings used for such purposes.

Among the special features were excursions through the beautiful orange groves

in which Pasadena is situated. Among the older members, an excursion to Hollywood attracted particular attention, and doubtless the home-town papers will have accounts of meetings with Will Rogers and Mae West.

Wonderful roads have been constructed along the coast, so that one can drive from the extreme southern point up as far as Santa Barbara just along the edge of the ocean, giving a panorama of high mountains which one can almost touch from the car window on one side, and the ocean on the other. The increase in population along the coast has been surprising, and the beaches are thronged by thousands practically every day.

When the invitation was given to visit California we were promised a warm reception—Pasadena has more than made good. However, one can cool off by a dip in the ocean all the year round.

A special feature was the visit to the Huntington Library which, although usually closed at this season, was opened for the Association. It contains the largest collection of Gainsboroughs in the United States. Outstanding among the treasures is the famous Blue Boy. The Library has also acquired a notable collection of early English books, proclamations, orders, and so forth, on public health, which shows that England was very far advanced before the decadent era which ended with Chadwick.

For the fourth year, the general meeting was preceded by the Health Education Institute, under the direction of Dr. Iago Galdston. The attendance was the largest of any year, 208 students having been registered, approximately 80 per cent of whom were from California, the rest from other states and territories. The Institute opened on the morning of August 31, and was continued mornings and afternoons, closing Monday morning.

It will be remembered that the New York Central Railroad arranged for a special train to accommodate representatives from eastern United States and Canada. More than 100 delegates made the trip across the continent. Stops were made at various points such as at the World's Fair in Chicago and at the Grand Canyon. Fortunately the inter-tribal meeting of the Indians was being held at Gallup, N. M., affording the unique opportunity of seeing the Indian ceremonies. The train was met in Pasadena by representatives of the local committee and Dr. J. D. Dunshee, the Health Officer of the state. On the return trip the excursionists were entertained in San Francisco by Dr. Geiger, Director of Health, by Dr. Sippy, at Stockton and Lodi, Dr. True, at Sacramento, Dr. Beatty of Salt Lake City, and Dr. Jaffa at Denver. Altogether the trip on the special train was unusually comfortable.

The scientific exhibits were of unusual interest. Prominent among these was the exhibit of The Deutsches Hygiene Museum. This was accompanied by Dr. Bruno Gebhard, as custodian, and was sent to this country by the Museum which is at Dresden. This was a most gracious action on the part of this organization, and Dr. Gebhard made many friends by his unfailing courtesy and clear demonstrations. The exhibits of Pasadena and Los Angeles were worthy of special notice. The engineering features of the water supply and sewage disposal of Pasadena were particularly well represented. Various excursions to the water shed and plants, afforded to health officers and engineers an opportunity to see them in operation. The State Board of Health had its travelling Plague Unit, fully equipped on hand, and examination of ground squirrels was constantly demonstrated.

The annual banquet held Wednesday evening at the Hotel Huntington was

largely attended. Great interest was shown in the address by J. W. O'Conner, M.R.C.S. from Columbia University, New York.

A notable feature of all the public meetings was the remarkable interest of the public, evidence of their interest and health consciousness. We regret that our constituent countries were not represented by larger delegations, but those who were present were of the highest quality. From Mexico came Dr. Francisco P. Miranda; from Canada, Dr. Robert E. Wodehouse; and Dr. Med. Bruno Gebhard from Germany. Mr. Aime Cousineau and Dr. S. Boucher of Canada were also present.

The words used are entirely inadequate in describing the good features of the Pasadena meeting and the reception given by the warm hearted inhabitants of Southern California.

PUBLIC HEALTH EDUCATION*

FROM PEOPLE WHO DON'T KNOW YOU

SEEK opportunities for meeting people who do not know you as the executive—people who belong to the audiences you have been reaching. Seek to learn what they think of various features of the effort. Did they respond to any of the appeals? Did they go to anything? Did they read anything? Do they remember any of the arguments? Did any of the printed matter reach them? Are they with you or 'agin' you or your project?

Budget Exhausted but Not the Demand—More about *Salud y Sanidad* mentioned under "We Salute Colombia!" in the August, 1934, issue:

The address is: Departamento Nacional de Higiene, Sección de Saneamiento Rural, Apartado 2508, Bogotá. The phrase "Para la Vulgarización y Propaganda de la Higiene" is simply a legend defining the purpose of the publication, although we trust that it is neither "vulgar" nor "propaganda," in the English sense.

This little health magazine has had a reception which has really surprised us. We started in 1932 with 6,000 copies and soon found that even by distributing it only to persons who requested it either by letter or in person that the issue was inadequate. We increased the number to 10,000 and later to 15,000, which exhausts our budget but not the demand. It is used in many schools as a text, and we have received a great many flattering comments. In fact, people take it so seriously that it keeps us worried with the fear that errors or disputable material may slip into it. Our effort is to make it scientifically sound first and then simplify the style. The Director of the publication, Sr. Ricardo Bonilla, has achieved a style which is really remarkable for its simplicity and clarity, and that, of course, has been all important in making it a success. We have tried to avoid the sentimental manner of "writing down" to our readers which so

often happens when physicians or public health men try to prepare "propaganda."—

George Bevier, M.D.

"Hygeia" for July, 1934—From time to time we list the main contents of *Hygeia*, the outstanding health publication for the general public. We thus supplement the historical record, provided in this department of the *Journal*, of current thought and activities in public health education. We hope also to remind our readers of a variety of easily available source material, and of topics which may merit consideration in state and local publicity.

A Sensible Vacation (editorial); Hazardous summer days; Skin cancer—actual and potential; Your children's eyes; Skeletons not in closets (pictures of Century of Progress exhibits); The campaign against corpulence; Manhattan spastic clinic; Save your child's teeth; Committee acceptance of fruit juices; Some famous victims of smallpox; The story behind the little purple stamp (federal government meat inspection); Refrigerator facts; The parathyroid glands; The hot weather problem in infant and child feeding; The bedbug; Training for athletics and health; Your summer vacation; I want to know: mysterious fluids; New books on health; Questions and answers; School and Health, including A new approach to health education; The challenge of vacation; Health examinations as basis of health education; Clinics now come in classrooms; A bibliography for solving health education prob-

* Please address questions, samples of printed matter, criticism of anything which appears herein, etc., to Evart G. Routzahn, 130 East 22d St., New York, N. Y.

lems; New health books for teachers and pupils.

One Is Free—One You Pay For— Happenings and developments in connection with the current activities of the Milbank Memorial Fund will be reported in the future in the *News Digest*, which it is planned will supplement the Milbank Memorial Fund *Quarterly* in spreading information regarding work in the fields of public health, medical care, and social welfare. While the subscription to the *Quarterly* is \$1 a year, the *News Digest* is sent without charge to professional workers in the fields to which the Fund directs its attention (40 Wall St., New York, N. Y.).

Reading References on Child Health and Health Education—The following mimeographed annotated lists are supplied upon request (single copies) to American Child Health Assn., 50 West 50th St., New York, N. Y.:

"Some Recent Contributions to Health Education." A brief list compiled as a service to instructors giving courses in health education. 3 pages.

"Supplementary Reading Materials for Health Education. Grades I-IX." Interesting types of reading suitable for classroom libraries. 6 pages.

"Health Education in Elementary Schools." Brief bibliography for classroom teachers. 6 pages.

"Some References on Child Care and Training for those conducting Child Care Classes in Secondary Schools or Parent-Teacher Groups." 5 pages.

"Some References on the School Lunch." 3 pages.

Riding a Hobby Horse—Public health education will be the better for the riding of hobbies by the workers in public health education. This thought prompts us to mention "Care and Feeding of Hobby Horses," by Earnest Elmo Calkins. This pamphlet of 112 pages "contains 700 suggestions for the use of leisure time" and the bibliography

lists 1,500 books and pamphlets for hobby riders. But it is more than lists. Note two chapter headings: "Getting More Joy Out of Life," and "What is Play?" Leisure League, 30 Rockefeller Plaza, New York. 25 cents.

For the "Women's Crusade"—This fall and winter many non-public health agencies will participate in community chest and other joint money raising efforts. It is anticipated that there will be increased coöperation by large groups of volunteer interpreters, in many cases under the name of the Women's Crusade.

The essence of this effort as a successful supplement to other promotion and publicity efforts is three-fold:

1. Organization and leadership
2. Preparation of usable material
3. Development of methods

Many helps and suggestions will reach the chests through Community Chests and Councils, Graybar Bldg., New York, N. Y., to which you may write for first-hand information if local interest is delayed.

National, state, and local health agencies may help the whole local effort, and better further the part of the health locals by working out ideas and materials suitable and effective for use by the volunteer interpreters.

A new approach would be the use of stillfilms or filmslides. The pocket projector as offered by two manufacturers is no larger than many of the folding cameras and can be used on any light circuit in home, office, or club. Forty or 50 "frames," picture or text units, equivalent to lantern slides, may be thrown on a wall or white card. The audience may be one person, or a group gathered in a home, club, or office.

A big value of the method is that it provides easy talking material for demonstrator and members of the audience.

By having a single projector and one copy of a film, a volunteer, or several

volunteers, could reach 2, 3, or 4 small groups in an afternoon. This could be repeated 4 or 5 days a week through a considerable period.

The amateur movie affords another valuable medium for the fall and winter campaigns. Now is the time to get pictures of camps and any other outdoor health activities.

A third little used medium is the marionette or puppet show. Both have been used successfully by health agencies. Neither has as yet been fully developed to present community, family, or individual health problems in a simple, straightforward way. Either promises considerable usefulness in reaching several types of audiences.

The three new media are described in order of difficulty in getting them into action. All three have the splendid value of offering usable material which can be handled by interested volunteers. All are comparatively inexpensive, and adaptable for use throughout the year, and are effective for groups not so easily reached by other means.

The editor of this department will be glad to tell you where to get full information about any or all of the above.

"Stay Away from Pasadena"—

A "warning" issue of *News Letter* of Western Branch, A.P.H.A. (Aug., 1934), was addressed to members of the different sections. We reprint two paragraphs, looking toward the 1935 meeting.

You'll be disappointed in the meeting if you belong to any of the following groups:

Public Health Educators are satisfied with their efforts to teach health in schools, health departments, among the general public, and in industry; are satisfied that their school medical and nursing program is a supreme educational experience for the child; know why some educational efforts succeed and others fail; get the utmost coöperation from their daily newspapers and radio broadcasting stations; know how to reduce dental caries in a school system 75 per cent through educational methods alone; know the tech-

nique of selling the health department to the public; know how to discriminate between good and poor publicity material.

A New Type of "Demonstration"

—A demonstration in which there are no outside funds, no outside supervision, no increased or exceptional staff members, no "the-world-is-watching-you" appeal.

As a complement to the undoubted values of the public health demonstration projects of recent years we propose for adult health education a different procedure.

The demonstration will start with the present staff and the current available funds of the department or association, local or state.

The one outside factor will be the enlistment of some of the "best minds" in the health education field to help think out the project.

Who is interested in this type of demonstration?

Health Education in August, 1934, Journal—The following articles are of interest to readers of this department:

"The Use of Laymen in Official Public Health Nursing Programs," by Dowling

"Qualifications and Training of Local Health Officers," by Parran & Griswold

"Public Health in Tudor England," by Larkey

"Medical Supervision in the Public Schools," by Gould. Includes paragraph summarizing the "Health Education Program"

For More than Hospitals—All institutional forms of health and medical care could benefit by application of the practical outline offered in "Hospital Ethics, Publicity, and Public Relations," by Dr. W. T. MacEachern. This appears in *Bulletin*, American Hospital Association, 18 E. Division St., Chicago,

Ill. Mention is made of ready-made press material, motion pictures, etc., available for hospital use.

In the opening paragraphs the author tries as others have done to offer a precise definition of "publicity" to find synonymous terms. There doesn't seem to be any satisfactory escape from words which in the course of a long life take on some unpleasant associations. The bad company so often trails right along with the new words. And the meanings of most words are determined by the individual who uses them, as well as by the individual who reads them. Hence we have no adequate word term for the diverse functions of health education and publicity (or health education or publicity, or health education publicity).

MAGAZINE ARTICLES

To quote: to write about.

"An Adventurer in the Conquest of Disease," by Theodore Roosevelt, Jr. *Saturday Review*, 25 W. 4th St., New York, N. Y. July 7, 1934. 10 cents. An appreciative review of "A Soldier in Science," by Bailey K. Ashford.

"Canadian Voodooism" illustrates that "Human credulity provides one of the serious barriers to medical progress." *Canadian Health*, Toronto, Ont. June, 1934. 15 cents.

"Dividends in Good Health," by Webb Waldron. *Today*, 152 W. 42d St., New York, N. Y. Aug. 11, 1934. 10 cents. "How for \$1 a month each family in Elk City, Okla., is assured complete medical and surgical care."

"How Will the Drought Affect Health?" "U. S. Public Health Service and state health agencies report a rise in typhoid cases"; "play safe" rules for draught area. *Literary Digest*, 354-4th Ave., New York, N. Y. Aug. 18, 1934. 10 cents.

"Machine Designers Consider Workers." *Literary Digest*. May 26, 1934.

Color and other factors in safety and health.

"A Milestone of Childhood," by Dr. H. L. K. Shaw. *New York Herald Tribune Magazine*. July 29, 1934. "Many a 'dull' child is not dull, but sick." Physical and dental examination is urged.

"Poisonous Snakes and Their Bites." *Literary Digest*. May 26, 1934.

"Rules of the Road; A Primer for Motorists," by C. Billings. *Atlantic*. Sept., 1934. The "sane conventions" of safe driving; the increase in accidents; rapid accident increase due to drinking.

"Silicosis, a Major Health Problem in Industry." *Literary Digest*. June 16, 1934.

"Stop Counting Sheep," by R. F. Wadsworth. *Collier's*. June 23, 1934. "When you want to sleep, don't try."

"That Rusty Nail"; "No Host Welcomes These Guests" (cock-roaches). *Everybody's*, 11 W. Summit Ave., St. Paul, Minn. July, 1934. 10 cents.

"Two Cures for Housing," by Morris Markey. *Saturday Evening Post*. June 25, 1934.

"What Is Health Insurance—And Will It Work?" by E. Sydenstricker. *Literary Digest*. July 7, 1934.

"What's Your Hurry?" *Collier's*. June 30, 1934. Page editorial on automobile accidents.

FOR EDUCATION OR REFERENCE

Usually where no price is given single specimen copies will be sent upon request.

"Average Age of Death." State Board of Health, Madison, Wis. An effective bar diagram by years, 1903 to 1933; 40.8 years to 55.4 years, with several decreases indicated.

"A List of Publications—Jan. to June, 1934." U. S. Public Health Service, Washington, D. C. Free.

For poison ivy the best help we have

discovered is "Poison Ivy and Poison Sumac and Their Eradication," a Farmer Bulletin of the Dept. of Agriculture. It covers more points as to the nature, control, prevention, and simple handling of these poisons than is otherwise available in one publication, and it is more specific on more points than is usual. Dated May, 1929.

"Instruction in the Effects of Alcohol and Tobacco," by J. F. Rogers, Office of Education. Renewed interest and present status; difficulties and dangers; information sources. 8 pages. Supt. of Documents, Washington, D. C. 5 cents.

"Warning on Poliomyelitis" and "How to Prevent Poliomyelitis" are two conversations broadcast by Los Angeles County Health Dept., Los Angeles, Calif. 5 and 7 mimeographed pages, supplemented by an 8-page booklet.

From State Dept. of Public Health, Boston, Mass.:

"Aids to Bowel Movement." 4 pages.

"Cooking for Health." 16 pages. Recipes and sample menus.

"The Difference between Tweedledum and Tweedledee." 4 pages. Radio talk which mentions "those words, gonorrhea and syphilis, that people and newspapers and magazines seem to fear so much."

"Food Customs from Abroad." 16 pages. Concise background statements; typical day's menu; food habits; bibliography—for French Canadian, Irish, Italians, Jewish, Near East, Polish, Portuguese.

"Rabies." 4 pages.

"Activities of the Department." 4 pages.

"Vitamins." 2 pages.

"Your Baby's First Teeth." 4 pages.

"Your Second Teeth." 2 pages.

Reprints from U. S. Children's Bureau, Washington, D. C.:

"Child Health 1933-1934," by M. M. Eliot, M.D. Critical review from Children's Bureau and Dept. of Pediatrics, Yale School of Medicine.

"The Need for a More Adequate Program of Maternal Care," by F. C. Rothert, M.D.

From Metropolitan Life Insurance Co., New York, San Francisco, and Ottawa:

"Vaccination Protects You Against Smallpox." 4 page folder.

"The Junior Safety Volunteer." 16 pages. "Tells how persons are frequently hurt on the street and in their homes, and how such accidents can be prevented," with "blank pages, too, for making a list of conditions which you think are unsafe and in need of correction."

"Health Programs in Professional Schools for Teachers." 44 pages. Includes "The Participation Approach in Health Education," "Coöperation of the Staff for Health Education," and "The Health of Students and Faculty."

"The Health of the Teacher." June, 1934, issue of *Health Bulletin for Teachers*.

BOOKS AND REPORTS

The Principles of Heating and Ventilation—By *H. M. Vernon, M.A., M.D.* London: *Edward Arnold & Co.*, 1934. 232 pp. Price, \$5.00.

This work by an expert who has devoted his life to the subject of heating and ventilating and whose works in connection with the Institution of Heating and Ventilating Engineers, the Technical Advisory Board of the National Institute of Industrial Psychology, and particularly as Investigator for the Industrial Health Research Board, is most timely indeed, and should have a large and appreciative reception in America as it may be said to summarize the latest views from a Britisher's standpoint. As a matter of fact, there are undoubtedly more references to research findings and committee reports of American origin than British, but the author has dwelt especially on the relations of the subject to health and physiological functions, which is a welcome innovation in an extensive field of publications dwelling essentially upon the engineering phases. The latter, however, are adequately covered as to principles and better practices, and make up most of the discussion.

The chapter headings involve environmental conditions controlling the heat loss from the human body; heat loss from buildings; heating by means of open fires; heating by hot water, steam pipes, and radiators; low temperature radiant heating; low temperature heating by electricity; the necessity for ventilation: natural ventilation; mechanical ventilation and warm air heating; control of humidity; and air conditioning and special ventilation in industry. Numerous tables and some 50 figures, all very well selected and pre-

pared, are included as well as a good index.

The book particularly discusses the practical aspect of various theories, reduces most technical information to the grasp of the intelligent lay reader who might be interested, and carries annotations at the bottom of the pages to sources of information which the author approves and which are practically all of recent date. The book is meant to be of especial value to architects, factory inspectors, health officials, health and sanitary officials. Notably, the importance of considering effective radiation as well as effective temperature, temperature gradients from floor to ceiling, insulation, new forms of heating, and instruments for use in interpreting atmospheric conditions, are excellently handled. One wishes that terms which may bewilder the less informed were specifically defined, that comment on lower limits of fresh air quantity were extended in view of the rapid spread of cooling devices, and that the author had announced his own conclusions more often after summarizing the facts selected from many sources.

Still, one can read between the lines that the author considers many current practices, *e.g.*, attempting to draw a rational deduction from all of the elements entering into heat loss from buildings, as possible of integration for practical purposes, and thereby explaining failures so noticeable everywhere in ventilation installations of the present day. In a country like America in which this field has been so largely run away with by the commercial interests involved, this book is a source of welcome enlightenment indeed.

The publishers are also to be com-

plimented upon placing in compact form, easy access, and good binding, the material comprised between the covers.

It would also be well to read at the same time the little volume put out in 1931, *School Ventilation, Principles and Practices*, representing the final contribution of the New York Commission on Ventilation. The present work endorses most of the Commission's findings, while it adds considerable in the way of new thought and experiences.

EMERY R. HAYHURST

Children of the New Day—By Katherine Glover and Evelyn Dewey. *New York: Appleton-Century, 1934.* 432 pp. Price, \$2.25.

A satisfactory method is employed in this book to interpret for parents and guardians the technical reports of the White House Conference on Child Health and Protection. It is presented along lines similar to the volumes appearing in the Century Childhood Library. The main sections of the White House Conference reports are set forth in simple, non-technical language and easy style. The "discussion points" at the end of each chapter present the major findings of the various committees of the Conference.

The book should popularize and extend the information assembled in the more detailed and formidable reports. It offers no easy solution of the problems it presents, but concludes that "perhaps the only real gift we can pass on to children today is awareness."

RICHARD A. BOLT

The Science of Work—By Morris S. Viteles. *New York: Norton, 1934.* 442 pp. Price, \$4.00.

This work is essentially a recasting in more popular form of a previous text, *Industrial Psychology*, by the same author. The earlier book was technical and exhaustive, but the present one

avoids most of the technical terminology, minimizes tables, resorts more widely to graphic presentation, and relegates the footnotes to an appendix. One other contrast with similar books is a somewhat broader point of view, responsive to problems of the present economic situation. For instance, the desirability of training workers in groups of related jobs to facilitate readjustment if the job is displaced by machine or depression; and the psychological problems of possibly adjusting 10,000,000 white collar workers to manual jobs in the next 10 years; again, where experiments with shortened hours have increased total output, the implications regarding government efforts to shorten hours to increase jobs.

After two chapters from the historical standpoint comes the discussion of employment problems. The procedure of job analysis is outlined, with forms and charts. The use of employment tests are standardized by comparison with ability in the job. The method is illustrated by numerous, brief, well selected examples. The author wisely cautions against the use of such tests by "amateurs."

An outstanding aspect of accidents is the existence of individual susceptibility and the possibility of measuring this by tests. Of equal importance is the study of the individual accident case from a clinical standpoint. Typical case-studies are included. Factors such as fatigue, ventilation, and attitude are discussed. The author recommends "the replacement of a fatalistic doctrine of 'chance' by a dynamic policy of individual mental hygiene in accident prevention."

Training considers practising only correct methods; training on the job rather than in the classroom; initial emphasis on accuracy rather than speed; distributed rather than intensive practice; and practice curves as a guide and for motivation. The author

presents recent data on the psychology of old age, and the possibilities of training older and more experienced workers.

To relieve fatigue by adjustment of hours is complicated by the worker's tendency to adopt a "congenial" pace. The optimal length of day will vary with the industry and even with the job. Efficiency is defined in terms of least physical cost and minimum feelings of fatigue and dissatisfaction—a commendably broad point of view. Experiments are cited on calorimetry during work, rest pauses, posture, intensity of illumination and air conditioning.

Regarding monotony, the author varies from the extreme social viewpoint and believes that only a small minority crave creative experience, while other adjustments are usually possible. Financial incentives have been somewhat overemphasized and we must consider the total personality of the worker. Employees often restrict production in the face of financial incentive. The rôle of "instincts" has likewise been overemphasized. A rather sound approach is to study motives and incentives experimentally just as with accident cases.

Then we have the possibilities of salvaging misfits with personality difficulties rather than discharging them. The approach is a clinical study of individual cases. Attention is called to the effect of long unemployment upon the individual's attitude.

The importance of supervision is considered. When turnover is negligible some supervisors become "real bosses" and loyalty hits a new low. Constructive measures include scientific selection of supervisors, systematic training (centered around case material), and a general "lead" rather than "drive" philosophy of management. Employee representation must be preceded by education as to its purpose and significance.

The author stresses repeatedly the concern of the industrial psychologist

with the happiness and contentment of the worker as well as his efficiency. Where necessary the worker should sacrifice economic to human values. Moreover he should be concerned not only with pleasure in work but with enjoyment of hours outside of work—in short, the entire environment.

The reviewer has no particularly adverse criticism. Attempting to cover a large field, the book obviously must touch points lightly and must select rigorously from the large amount of material available. Such selection is well made, and illustrative material is concrete and to the point. Business readers will be interested in the various "forms" provided as those for job specification.

The book obviously is written down to the level of the non-technical reader but remains systematic. It is enlivened by simple line drawings in somewhat cartoon style. Even some of the charts are so embellished. The author might well have carried this slightly humorous flavor into portions of the text. The work is well done and attains its objective. The reader will find it a very good introduction to the field of industrial psychology.

HAROLD E. BURTT

Lord Lister: The Discoverer of Antiseptic Surgery—By C. J. S. Thompson, M.B.E. London: John Bale, Sons & Danielsson, Ltd., 1934. 99 pp. Price, \$1.75.

This charming little book has been written to fill what has long been recognized as a need; namely, a short biography for the use of students and general readers. The author has consulted Sir Rickman J. Godlee's biography of Lord Lister, which is justly regarded as one of the great biographies of all time.

The book contains only 93 pages of text. It is written in good style, gives all of the main facts which the public

needs to know of Lord Lister, and ends with a short chapter on "Humanity's Debt to Lister," in which is quoted Sir Frederick Treves's statement: "He is the greatest benefactor of mankind which any age has known. His life and work will live for ever."

The book can be thoroughly recommended, and we wish for it a wide circulation among the profession as well as the laity. Only education can stop some of the innumerable cults which pretend to heal diseases, but which in the main do tremendous damage to the cause of public health.

MAZÛCK P. RAVENEL

A Soldier in Science: The Autobiography of Bailey K. Ashford. *With a foreword by Major General M. W. Ireland.* New York: William Morrow & Co., 1934. 425 pp. (Ill.) Price, \$3.50.

One picks up an autobiography by a contemporary man of science with a question. Can a man write about his own work with sufficient modesty and yet make an interesting story? Dr. Ashford has achieved a difficult task. Here is the story of experiences just as Colonel Ashford would relate them to his friends in moments of leisure and when all are in the mood for exchanging stories about the War, the laboratory, the campaign for hookworm, or how Puerto Rico got its School of Tropical Medicine.

Just as, through such talk one enjoys the experience of making the acquaintance of a man, so you make the acquaintance of Colonel Ashford. It is such a human story that the reader soon feels he has caught this interesting personality in his laboratory; when he will talk about his Sprue cases, he shows you his beautiful *Monilia* cultures, and he describes the objections of the scientific world to accepting his point of view on the relation of *Monilia psilosis* to tropical sprue.

How the Army sent him here and there and how each time he got orders to return to Puerto Rico is a narrative full of such triumphs, humor, and interest that the reader hurries in from one incident to another.

One of the most interesting chapters is the battle for recognition of the fact that the profound anemia of the Puerto Rican peasant was caused by hookworm, and how he spread the news throughout the Island that the anemia "was being cured for the first time in the memory of man—was being cured by certain mysterious little glass balls, together with purges." The clamor that went up to continue this work was so formidable "that gentlemen in frock coats who took no interest whatsoever in such things nervously consented to any proposition that would keep their constituents quiet and satisfied." Here is a story of public health progress that will intrigue any administrator.

Former Surgeon-General Ireland in a foreword reports, "The University of Cairo, conferring an honorary degree upon Colonel Ashford several years ago, introduced him as "Prophet of Tropical Medicine in the New World, who has rendered incalculable services to Science and Mankind." Such services he has no doubt rendered but a story so real and true to this soldier in science will give inspiration and courage to many who will continue to carry on long after Colonel Ashford has inoculated his last guinea pig. Romance and ideals of medical science are portrayed through the richness of experience of Colonel Ashford's life to date.

HAROLD H. MITCHELL

National Quarantine Service, Series IV—*Edited by Wu Lien-Teh, Director, and C. Y. Wu, Senior Quarantine Officer, 1933.*

In the preface to the fourth annual report of the National Quarantine Service of China, the editors state that

it has been their object to make this book a reliable guide to the manifold activities of the Service, and, at the same time, having in mind their obligations as a public body toward lay organizations, such as the mercantile and shipping interests in the country, to present a readable and not too technical account of that section of the work which is most closely connected with the commercial world. In this endeavor they have succeeded admirably.

The volume opens with a series of original articles on plague and cholera, which are not only of absorbing interest, but are of scientific and historical value as well, and should appeal strongly to research workers and quarantine executives. The next section is devoted to a series of well written and informative special articles dealing with the recent public health activities in Shanghai and with the transactions of the Central Cholera Bureau. There is also included an account of the fourth annual dinner of the National Quarantine Service, with a number of the speeches delivered during the evening. Then follow reports of the Administrative, Boarding, Fumigation, and Medical Services Division, and of the branch stations at Amoy, Chinwangtao, Tientsin, Taku-Tangku, Wuhan (Hankow), and Canton, all of which should especially make a ready appeal to non-medical readers interested in port health development in China. The book is brought to a conclusion by the insertion of a list of the personnel of the Quarantine Service at headquarters and at the branch stations.

The report shows that, notwithstanding the political and economic disorder which prevailed in China during the year, steady improvement was made in all branches of the Service. Two of the more outstanding achievements of the year, in addition to the maintenance of the work of medical inspection and fumigation on an efficient basis, were

the continuation of the rat-flea survey of Chinese ports which was begun in 1931, and the inauguration, in 1933, of systematic experiments upon the occurrence and viability of cholera and related vibrios in Shanghai waters. Comprehensive accounts are given of the results so far obtained.

A plan to produce a series of monographs on the infectious diseases commonly occurring in China was launched toward the end of the year by the publication of the first volume—a manual on cholera, compiled by senior members of the Quarantine Service. While this monograph was written especially for the medical profession of China, it covers a wide field and should be generally useful to the medical profession throughout the Far East and also to anyone engaged in an extensive study of the cholera problem.

During the year, a site was acquired for a new quarantine station at Shanghai, and plans were perfected for the erection of up-to-date buildings to house the various activities. Upon the completion of this station, the quarantine facilities at Shanghai are expected to be adequate for practically any emergency.

In spite of the great difficulties under which the Chinese National Quarantine Service has labored since its inauguration in 1930, it has carried out many helpful reforms and has greatly enlarged the scope of its activities.

Research has been persistently prosecuted into many problems intimately affecting the public health of the country. At the same time, regular contact has been maintained with international organizations such as the International Office of Public Hygiene and the Health Section of the League of Nations. The year 1933 saw the realization of efforts to place on a satisfactory basis the collection and dissemination of epidemiological information relating to Chinese ports. Weekly

bulletins of communicable diseases were distributed regularly to port and city health authorities in China and neighboring countries.

The editors have contrived to give a great deal of information in compact form, without over-elaboration; yet everywhere the sentences flow smoothly and make pleasant reading. One color plate and 27 half-tone illustrations are attractive features of the book, while numerous charts and tables add to its value. The report is cordially recommended to the readers for whom it is designed.

F. A. CARMELIA

The Savannah Cook Book. A Collection of Old Fashioned Receipts from Colonial Kitchens—Collected and Edited by Harriet Ross Colquitt, with an introduction by Ogden Nash. New York: Farrar & Rinehart, 1934. 186 pp. Price, \$2.00.

Now, good digestion wait on
appetite,
And Health on both!

During the last few years, in a number of our cities which are famous for their cooks and cookery, there have arisen loyal citizens, mostly women, who have collected the "receipts" for which the particular city is famous. There is no pretense that this book is written in the interest of public health, and probably the authors would not pass very outstanding examinations on balanced rations, vitamins, etc.

We have no wish to force a point, but believe that the researches of Cannon, Pavloff, and others, have demonstrated the value of the esthetic point of view in the preparation and service of foods. From the economic standpoint it may be emphasized that rice, which furnishes the main article of food for approximately one-third of the population of the world, is not sufficiently eaten, possibly because it is not properly prepared, in a large part of the United States. The book before us is especially

strong in methods for preparing sea foods and rice dishes, and can be heartily recommended.

MAZÏCK P. RAVENEL

You Must Relax—By Edmund Jacobson, M.D. New York: McGraw-Hill, 1934. 201 pp. Price, \$1.50.

The author's attempt is to explain—to the layman—"how to relax while you are working, playing, or resting."

The general thesis of this text is apparently: "In the rush of the present day, man has in part forgotten how to live."

After discussing various types of tense persons, and the causes of over-active nerves, the author takes up the various means of artificially soothing the nervous system; drugs, massage, hydrotherapy, change of environment, diet, and rest.

He then launches into his main idea—cultivated relaxation. Relaxation is a habit and like any habit may be cultivated by regular daily practice. Among others, there are chapters on "How to Relax Lying Down," "How to Relax while Active," "Relaxing Worry," "The Quest for Sleep," and on "Indigestion and Colitis and on Blood Pressure as related to fatigue of the nervous system—over-emotion."

This is a worthwhile book which it will repay both laymen and physicians to read carefully. It brings to the fore the close relationship between agitation and other mental states, and such health factors as intestinal upsets, blood pressure, and nutritional states, and prescribes a method whereby the one afflicted may bring about his own relief.

CHARLES H. KEENE

Manual of Nursery School Practice—By Iowa Child Welfare Research Station. Bulletin of the State University of Iowa, New Series, No. 730, March 10, 1934. Price, \$1.00.
This is a well conceived and executed

manual of the development and present status of preschool practice at the Iowa Child Welfare Research Station in Iowa City. Following several introductory chapters on the nursery school idea and preschool education, a detailed description is given of housing, equipment, personnel, and technics used at the Iowa Station. These are illustrated beautifully and appropriately with photographs taken on the premises. The reading material is arranged conveniently for reference.

Its completeness leaves no doubt as to what the research projects are and how they are being pursued in detail. Typical daily schedules are given for each age group. A complete set of record blanks is reproduced. The "developmental record" should prove of especial interest to those engaged in nursery school work. Ten full pages of excellent reference on nursery schools and nursery education complete the bulletin.

This informative and helpful manual is recommended highly to all those interested in preschool education and in the nursery school movement.

RICHARD A. BOLT

Military Medical Manual—Produced for The Military Surgeon by The National Service Publishing Company, Washington, D. C., 1934. 774 pp. Price, \$4.50.

Adequate preparedness for national defense is one of the best preventives of war. Since, however, the human race seems to display a biological tendency toward conflict, war may be inevitable. In a world fairly seething with international distrust, belligerency, and arrogance, military preparedness is a positive safeguard, by making possible a more effective defense.

In time of war, no branch of the military forces is more important than the army medical department, the mission of which is to prevent disease and con-

serve health, as well as to care for the sick and wounded.

The information needed by officers of the Medical Department of the U. S. Army, which includes members of the Medical, Sanitary, Dental, Veterinary, and Medical Administrative Corps, is set forth in a comprehensive manner in this excellent manual, which should be owned and studied by every reserve officer in these services. In the 17 parts of this well printed book will be found useful and interesting material on military policies, administration, organization, law, hygiene, sanitation, hospitalization, evacuation, and medico-military science.

As Surgeon General Robert U. Patterson states in a brief foreword, *The Military Surgeon* has performed a real service in making available this volume covering the whole range of subjects in which patriotic members of the medical and public health professions should be proficient.

JAMES A. TOBEY

The Road to Adolescence—By Dr. Joseph Garland. Cambridge, Mass.: Harvard University Press, 1934. Price, \$2.50.

This is a book that deserves wide reading. It is a successful attempt to bring together in a usable form for those concerned with growing youth the more important results from long experience and recent studies. The author evidently has first-hand knowledge of his subject and is familiar with the latest contributions.

All through the book runs a vein of conservative common sense; new ideas and suggestions are wisely evaluated, and the conclusions expressed in a terse and interesting style.

It is gratifying to see the importance that is placed upon the kind of material our children receive through inheritance, and upon the value of eugenics, a science which, as yet, is receiving too little practical attention.

Subsequent chapters discuss the anatomy and physiology of the growing child, the care of the body, nutrition and diet, the recognition and care of sickness, vaccines and serums, first aid to the injured, home, school and camp, and special problems in education, with a final word—"As the twig is bent," in which the environment of the home and the responsibility of parents for developing the latent possibilities of their children are tactfully but vigorously stated. "We cannot turn the potato into a lily or the oak into a willow," says the author, "our province is to make our potatoes the best in the countryside and our oak the sturdiest in the forest."

The various factors that play a part in this complicated problem—the home, the school, private or public, occasion-

ally beginning with nursery school and kindergarten, special classes for special problems, the value of proper play and exercise—are all discussed with that wisdom which only results from intimate knowledge. One regrets that the value of the midday rest for all children under 7 years is implied but not emphasized. Dr. Garland's book discourages fads in child care and training but is replete with many facts and suggestions which should be of real assistance to those who wish to be guided wisely in this difficult field.

A job of each generation is to produce children of the best possible material and then to prepare them adequately in body and mind for their future tasks. To this great endeavor in our day this book is a helpful contribution.

J. H. MASON KNOX, JR.

BOOKS RECEIVED

DIPHTHERIA—PAST AND PRESENT. By J. Graham Forbes. London: John Bale, Sons & Danielsson, 1932. 832 pp. Price, \$15.00.

LORD LISTER. THE DISCOVERER OF ANTISEPTIC SURGERY. By C. J. S. Thompson. London: John Bale, Sons & Danielsson, 1934. 99 pp. Price, \$1.75.

THE SAVANNAH COOK BOOK. By Harriet Ross Colquitt. New York: Farrar & Rinehart, 1933. 186 pp. Price, \$2.00.

THE SPASTIC CHILD. A Record Successfully Achieved Muscle Control in Little's Disease. By Marguerite K. Fischel. St. Louis: Mosby, 97 pp. Price, \$1.50.

EGGS. By Mary E. Pennington, Frank L. Platt, Clara G. Snyder and Paul Mandeville. Chicago: Progress Publications, 1934. 631 pp. Price, \$2.00.

THE LABORATORY NOTEBOOK METHOD IN TEACHING PHYSICAL DIAGNOSIS AND CLINICAL HISTORY RECORDING. By Logan Clendening. St. Louis: Mosby, 1934. 71 pp. Price, \$.50.

TEXT-BOOK OF MEAT HYGIENE. 6th ed. By Richard Edelmann, John R. Mohler and Adolph Eichhorn. Philadelphia: Lea & Febiger, 1933. 474 pp. Price, \$5.50.

MOTHERS' GUIDE WHEN SICKNESS COMES. By Roger H. Dennett and Edward T. Wilkes. New York: Doubleday, Doran, 1934. 400 pp. Price, \$2.50.

INFLUENZA. Part II. Annals of the Pickett-Thompson Research Laboratory. By David Thomson and Robert Thomson. Baltimore: Williams & Wilkins, 1934. 1557 pp. Price, \$17.50.

A SELECTED PUBLIC HEALTH BIBLIOGRAPHY WITH ANNOTATIONS

RAYMOND S. PATTERSON, PH.D.

Controlling Contagion—Preventive measures to be used against scarlet fever, diphtheria, measles and whooping cough are all covered in this interesting British symposium.

BANKS, H. S., *et al.* Control of the Common Infectious Diseases. *Pub. Health* 47, 11:348 (Aug.), 1934.

Protecting Against Tetanus—Alum precipitated tetanus toxoid in 2 doses of 1 c.c. given 3 months apart produces a state of immunity which affords protection if a third 1 c.c. dose is given at the time of injury.

BERGEY, D. H. Active Immunization Against Tetanus Infection With Tetanus Toxoid. *J. Infect. Dis.* 55, 1:72 (July-Aug.), 1934.

Showing Up the Supposed Cancer Increase—Studied by age groups in New York City, it appears that there has been no increase of "visible" cancer (skin, breast, buccal cavity, female genitals), in the last three decades. From this it may be inferred that the increase in "invisible" cancer is due to better diagnosis.

BOLDUAN, C., and WEINER, L. Is Cancer More Prevalent? *Am. J. Cancer* 21:4:825 (Aug.), 1934.

Experiments in Health Insurance—Trials and tribulations of projects in mutual medical service in California are reported with every evidence of impartiality.

BROWN, P. K. California's Medical Mix-Up. *Survey Graphic* 23, 9:429 (Sept.), 1934.

Tuberculous Children—Among 6,000 New York children admitted to

hospitals, 13 per cent of the boys and 15 per cent of the girls reacted positively to tuberculin: among 2,000 attending "well" children clinics there were about the same percentage of reactors; while among 6,000 attending tuberculosis clinics half were reactors. Rates in other cities are compared.

DROLET, G. J. The Incidence of Tuberculous Infection among Children in New York City. *Am. Rev. Tuberc.* 30, 1:1 (July), 1934.

It Goes for Us too—Four British authorities answer the question: Are We Satisfied with the Results of Antenatal Care? The net answer seems to be: No, but the outlook is hopeful.

FAIRBAIRN, J. S., *et al.* Are We Satisfied with the Results of Antenatal Care? *Brit. M. J.* 3839:193 (Aug. 4), 1934.

Trichinosis Increases in New York—A 5 year study including 166 cases of trichinosis emphasizes anew the extreme importance of adequate cooking of pork and pork products.

FRANT, S. Five Years' Experience with Trichinosis in New York City. *Pub. Health Rep.* 49, 30:869 (July 27), 1934.

Polio Comes Early to California—Steps taken to deal with a California outbreak of poliomyelitis are outlined in this preliminary report. One finding noted is that affected individuals may be found in all age groups. The term "infantile" is inappropriate.

GEIGER, J. C., *et al.* Acute Anterior Poliomyelitis. *J.A.M.A.* 103, 5:342 (Aug. 4), 1934.

Decent Rivers—Progress is reported in the movement to enact laws to prevent stream pollution, and stream con-

trol agencies are functioning in ever wider areas—so it is claimed. May they continue to prosper!

HOSKINS, J. K. Stream Pollution Control. Water Works Eng. 87, 16:870 (Aug.), 1934.

Prompt Diphtheria Immunization

—That alum precipitated toxoid immunizes quickly against diphtheria is evidenced by this study in which better than 90 per cent of the subjects were rendered Schick negative from 40 to 90 days after treatment with 1 c.c. dose.

KELLER, A. E., and LEATHERS, W. S. Alum Precipitated Diphtheria Toxoid. J.A.M.A. 103, 7:479 (Aug. 18), 1934.

More Health Insurance—Methods for providing medical services for everybody are discussed in stimulating detail. Answers to these questions are proposed: who shall be covered? what services shall be given? how will they be paid for? how shall the service be administered?

KINGSBURY, J. A. Health Insurance for American People. Pub. Health Nurs. 26, 8:423 (Aug.), 1934.

Milk as a Vehicle for Vitamin D

—Crystalline vitamin D added to milk was more potent as an antirachitic factor than when administered dissolved in oil. Antirachitic agents must be given directly to nursing infants; feeding the mother cannot be relied upon as a method of administration.

LEWIS, J. M. Clinical Experience with Vitamin D Milk. New York State J. Med. 34, 15:685 (Aug. 1), 1934.

When Health Education Is Neglected—Immunization against diphtheria and/or smallpox vaccination

when done are in most instances medical services rendered without the accompaniment of effective health education. The results are obvious.

PALMER, G. T., and DERRYBERRY, M. Medical and Public Health Attitude toward Smallpox Vaccination and Diphtheria Immunization. New Eng. J. Med. 211, 9:413 (Aug. 30), 1934.

Influencing Human Behavior—

Among Ontario children a wide variety of health habits was discovered in respect to eating wholesome meals, good sleeping habits, and the like. The beneficent effects of health education were not pronounced.

PHAIR, J. T. Survey of Health Habits among School Age Children. Canad. Pub. Health J. 25, 8:380 (Aug.), 1934.

What Expectant Mothers Need—

In a country-wide sampling and study of maternal deaths it was found that a third were caused by abortions. Of those mothers that might have had prenatal care, more than half had none, a fourth had poor care, only an eighth had reasonably good care.

ROTHERT, F. C. The Need for a More Adequate Program of Maternal Care. Pub. Health Nurs. 26, 8:407 (Aug.), 1934.

For Lady Nicotine's Devotees—

Cigarette smoking produces a marked drop in surface temperature of fingers and toes, slows the blood flow in the capillaries. Nicotine is one of the toxic factors, but carbon monoxide is not. It will be interesting to see how these findings will be used in cigarette advertising.

WRIGHT, I. S., and MOFFAT, D. The Effects of Tobacco on the Peripheral Vascular System. J.A.M.A. 103, 5:318 (Aug. 4), 1934.

ASSOCIATION NEWS

OFFICERS, 1934-1935

President, EUGENE L. BISHOP, M.D., Nashville, Tenn.

President-elect, WALTER H. BROWN, M.D., Palo Alto, Calif.

First Vice-President, J. C. GEIGER, M.D., San Francisco, Calif.

Second Vice-President, JAMES ROBERTS, M.D., Hamilton, Ont., Canada

Third Vice-President, FRANCISCO DE P. MIRANDA, Mexico City, Mexico

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1935 MEETING IN MILWAUKEE

EUGENE L. BISHOP, M.D., PRESIDENT

WALTER H. BROWN, M.D., PRESIDENT-ELECT

WITH the Sixty-third Annual Meeting in Pasadena, Calif., Haven Emerson M.D., retired from the office of President of the A.P.H.A., which office he has so ably filled during the past year. E. L. Bishop, M.D., who was President-Elect, became President,

to serve for the year 1934-1935. For two years preceding Dr. Bishop's election as President-Elect, he served as Chairman of the Executive Board. It will be remembered that he was instrumental in the organization of the Southern Branch A.P.H.A. He is Ten-



Eugene L. Bishop, M.D.



Walter H. Brown, M.D.

nessee State Commissioner of Public Health, and now serving also as Director of Health of the Tennessee Valley Authority, Knoxville, Tenn. Dr. Bishop has been a member of the A.P.H.A. since 1921, and a Fellow since 1924. He is a Life Member.

The new President-Elect is Walter H. Brown, M.D. of Palo Alto, Calif. He is one of a small group of public health workers actively engaged in promoting a well organized public health program in the Far West. He is President of the Western Branch A.P.H.A., which celebrated its Fifth Anniversary by a joint meeting with the parent Association in Pasadena. Dr. Brown will bring to his duties a sympathetic understanding of the problems and needs of the active health worker, based upon a broad experience as an administrator and teacher.

Dr. Brown was graduated from Jefferson Medical College, Philadelphia, in 1906; he practised medicine in Richlandtown, Bucks Co., Pa., 1906-1913;

was graduated from Harvard-M.I.T. School for Health Officers in 1914; was Epidemiologist of Massachusetts State Department of Public Health, 1914-1915; Health Officer of Bridgeport, Conn., 1916-1919; Associate Director of Health Service, American Red Cross in Washington, D. C., 1919-1920; with the Rockefeller Foundation 1920-1921, assigned to the Commission for Prevention of Tuberculosis in France; Director of Child Health Demonstration, 1921-1925, conducted at Mansfield, Ohio, under the direction of the National Child Health Council, on a grant by the American Red Cross; with the Commonwealth Fund of New York City, 1925-1927, assigned to the Directorship of the Child Health Demonstration in Marion Co., Ohio; and since 1927, has been Professor of Hygiene, Leland Stanford University, Palo Alto, Calif.

Dr. Brown has been a member of the A.P.H.A. since 1915, and a Fellow since 1922.

RESOLUTION ON THE DEATH OF DR. FREDERICK W. SEARS

DR. Frederick W. Sears of Syracuse, New York, died suddenly in Butte, Montana, on August 30, 1934, while on his way to attend the meeting of the Association. Dr. Sears has been a Charter Fellow of the A.P.H.A. since 1922 and a member since 1914, and took an active part in its affairs. At the height of a successful career, Dr. Sears gave up his large surgical practice in order to devote his full time to service in the New York State Department of Health.

During his 20 years as State Sanitary Supervisor and District State Officer, he not only showed rare administrative talents and teaching ability but also became known for his important contributions to preventive medicine. He was a pioneer in diphtheria immunization, a

procedure demonstrated to be practical and effective by Dr. Sears, long before its general adoption, and carried on by him until his death with the collection of one of the largest known series of individual records.

Therefore **BE IT RESOLVED**, that the members of the A.P.H.A. record their official recognition of the distinguished service to public health, rendered by Dr. Sears, at the same time expressing their deep sorrow in the loss of a valued member and a friend of unfailing kindness and great personal charm; and be it further

RESOLVED, that this resolution be spread upon the records of this meeting, and that it be transmitted to Dr. Sears' family.

SEDGWICK MEMORIAL MEDAL

AT the Pasadena meeting the Sedgwick Memorial Medal for distinguished service in public health was awarded Edwin Oakes Jordan, Ph.D., Department of Hygiene and Bacteriology, University of Chicago. Dr. Jordan is a graduate of M.I.T., 1888, and served as Chief Assistant Biologist of the Massachusetts State Board of Health immediately after graduation. He was Lecturer in Biology at M.I.T. at the same time, being thus associated with Prof. William Thompson Sedgwick in whose name the medal is granted.

Dr. Jordan was called to the University of Chicago in 1892, when the university was founded. He was an associate in the department of anatomy where he began the teaching of bacteriology, instructor, assistant professor, associate professor, and finally professor of bacteriology. He held his departmental chair in bacteriology from 1907 and the chairmanship of the Department of Hygiene and Bacteriology from 1914 until a few years ago. He was then appointed to a Distinguished

Service Professorship which he held until he retired from formal teaching and administration in the University of Chicago. He has many scientific papers to his credit. His textbook of *General Bacteriology*, probably his best known work, was published in 1908. In 1917 appeared *Food Poisoning*, in 1924, *A Pioneer in Public Health—William Thompson Sedgwick* of which Dr. Jordan was one of the three authors. In 1927 he published *Epidemic Influenza*. In 1928 *The Newer Knowledge of Bacteriology and Immunology* came out, by Dr. Jordan and Professor Falk. He was a member of the International Health Board of the Rockefeller Foundation from 1920 to 1926.

In recent years Dr. Jordan has been a leading member of the Board of Health of Chicago. The full list of activities, connections, and notable services is a very long one. He has been a member of the A.P.H.A. since 1899 and became a Charter Fellow in 1922. He did much work in the development of the Standard Methods of A.P.H.A.

NEW MEMBERS

The following list includes applicants who have been approved for membership in the A.P.H.A. by the Sub-Committee on Eligibility. These new members have requested affiliation with the sections indicated, and action by the Section Councils will follow.

Health Officers Section

Clarence I. Drummond, M.D., Court House, Medford, Ore., County Health Officer
 Frank H. Garriss, M.D., Windsor, N. C., Bertie County Health Officer
 David B. Tuholski, M.D., 93 Main St., Brockton, Mass., Health Officer
 Louis S. Welty, M.D., Denton, Md., Deputy State and County Health Officer

Laboratory Section

Branch J. Aymond, M.D., Rapides Parish Health Unit, Alexandria, La., Acting Director
 Theodore D. Beckwith, Ph.D., 405 Hilgard Ave., Los Angeles, Calif., Professor of Bacteriology, University of California

William N. Berg, Ph.D., 104 Fifth Ave., New York, N. Y., formerly with Bureau of Animal Industry, Washington, D. C.
 George E. Coleman, 609 Hot Springs Road, Santa Barbara, Calif., Research Associate in Medicine, Hooper Foundation, University of California
 Gerard Laviano, M.D., 381 Myrtle Ave., Albany, N. Y., formerly with Division of Laboratories and Research, N. Y. State Dept. of Health
 Horace H. Selby, 3787 California St., San Diego, Calif., Chief Chemist, Hage's Ltd.

Public Health Engineering Section

Joseph M. Sanchis, B.S., 207 S. Broadway, Los Angeles, Calif., Chemist, Dept. of

Sanitary Engineering, Bureau of Water Works and Supply
 Orra Shonyo, Blytheville, Ark., District Supervisor, Sanitation and Malaria Control

Industrial Hygiene Section

Jorge L. Collada, C.E., Colima 60, Mexico, D.F., Mex., Civil Engineer, Industrial Hygiene Dept.

Food and Nutrition Section

Robert N. Berry, B.A., 55 S. Second West, Logan, Utah, Bacteriologist and Chemist, Morning Milk Co.

M. F. Brobst, B.S., 757 Revere Rd., Glen Ellyn, Ill., Charge of Nutrition and Vitamin Studies, Health Products Corp.

Edward M. Chace, 148 S. Mission Rd., Los Angeles, Calif., Chemist, U. S. Dept. of Agriculture.

Mrs. Eva B. Cronk, 1339 Vista St., Hollywood, Calif., Lecturer on Home Economics

James R. Esty, Ph.D., 322 Battery St., San Francisco, Calif., Director, Western Branch Laboratories, National Canners Assn.

Sophia S. Halsted, B.S., Dept. of Health, Detroit, Mich., Director of Nutrition

Margaret C. Smith, Ph.D., Dept. of Nutrition, Univ. of Arizona, Tucson, Ariz., Nutrition Chemist

Child Hygiene Section

Lenore H. Gageby, M.D., 4517 Lomita St., Los Angeles, Calif., School Physician, City Schools

Helen B. Pryor, M.D., 626 Tennyson Ave., Palo Alto, Calif. (Assoc.)

Public Health Education Section

Maurice LeBosquet, Jr., 231 S. LaSalle St., Chicago, Ill., Sanitary Engineer, Byllesby Engineering and Management Corp.

Paul Neiman, 826-33 Ave., San Francisco, Calif., General Secretary, San Francisco Tuberculosis Assn.

Reginald H. Smart, M.D., County Health Dept., Los Angeles, Calif., Consultant Physician, Tuberculosis Division

Louise E. Taber, M.D., 1944 Webster St., San Francisco, Calif., Division of Child Welfare, Dept. of Public Health

Helen L. H. Woodroffe, M.D., 844 Seventh St., Santa Monica, Calif., School Physician, City Schools

Public Health Nursing Section

Mrs. Guy W. Atwood, R.N., Route 6, Chattanooga, Tenn., County Nurse

Margaret L. Boyle, R.N., Health Dept., Worcester, Mass., Supervisor of Nurses

Lucinda Gonawein, 1016 Rawson Place, Fremont, O., School Nurse

Florence C. Johnson, R.N., 133 E. Haley St., Santa Barbara, Calif., Director of Nursing, Santa Barbara Visiting Nurse Assn.

Rachel K. Miller, R.N., 906 Blair Ave., Oakland, Calif., formerly Supervisor of Public Health Nursing, City Health Dept.

Mellie F. Palmer, R.N., 629 Third St., Des Moines, Ia., School Nurse

Phoebe E. Sheppard, Eagle Butte, S. D., Indian Field Service

Unaffiliated

Imogene H. Abbey, 328 N. Balcom Ave., Fullerton, Calif., Public Health Nurse, Orange County Health Dept.

Chesley Bush, M.D., Livermore, Calif., Medical Superintendent, Arroyo Sanatorium

Mabel G. Flanley, M.S., 4417 White Bldg., Seattle, Wash., Secretary-Manager, Washington State Dairy Council

Minerva B. Pontius, M.D., 123 S. East 1st St., Evansville, Ind., formerly Assistant Physician, State Hospital for the Insane

NEWS FROM THE FIELD

NEW MEXICO ASSOCIATION ELECTS OFFICERS

AT the meeting held in Los Vegas, N. Mex., July 17-18, new officers of the New Mexico Public Health Association were elected as follows:

President, Eugene P. Simms, M.D.

Vice-President, W. E. Kaser, M.D.

Secretary-Treasurer, Eleanor L. Kennedy, R.N.

The next annual meeting will be held in Santa Fe, April 30, May 1, 1935.

ITALIAN DECREE PROVIDING FOR THE PROTECTION OF WORKING MOTHERS

General Provisions—The decree of March 22, 1934, providing for the protection of working mothers in Italy coördinates and amends the previous legislation on this subject. The number of women affected is much larger than heretofore, because the decree applies to workers in practically all occupations—all workers except domestic servants; wives and other near relatives of employers; home workers under certain conditions; employees of the National Government, the provinces, the communes, and public benevolent institutions; public school teachers, if provision for their protection is not made otherwise; and agricultural workers. However, the provisions of the decree may be extended to women engaged in heavy agricultural labor if this is recommended by the Minister of Corporations.

Facilities for Nursing Mothers—An employer must permit every nursing mother to have two daily periods of 1 hour each in which to nurse her child, exclusive of the regular rest periods provided by law. The owner of every

establishment employing 50 or more women between the ages of 15 and 50 must provide a special room for nursing, unless there is in the neighborhood an infant welfare station where the mother may nurse her child conveniently. The nursing room must be well lighted, ventilated, and heated during the cold season; it must be kept clean and must be supplied with drinking water. If such a nursing room is provided in the establishment the nursing periods may be reduced to ½ hour each.

In establishments employing 100 women or more between 15 and 50 years old, factory inspection authorities may require the employment of a trained staff to care for the children of women employees while the mothers are at work.

Compulsory Insurance, Benefits and Premiums—Every woman between 15 and 50 years of age engaged in any of the occupations to which this decree applies is obliged to take out maternity insurance unless her wages are more than 800 lire a month. The maternity insurance is administered by the National Maternity Fund. The insured woman receives 300 lire in case of childbirth (twice the amount paid under the old law) and 100 lire in case of spontaneous or therapeutic abortion if it takes place after 3 months of pregnancy. The daily payment of half a lire to expectant mothers unable to work has been discontinued. A woman loses her right to the maternity benefit if she has been sentenced for infanticide or self-induced abortion, or in case of spontaneous or therapeutic abortion if she fails to present her claim within 30

days. A woman who enters other employment while she is on leave because of pregnancy and childbirth loses a part of her benefit.

Every woman carrying maternity insurance must pay 3 lire annually, to which the employer must add 4 lire. Any agreement to the contrary between employer and worker is prohibited by the decree.

The Government subsidizes the National Maternity Fund to the extent of 18 lire for each childbirth or abortion.

Penalties are provided for violations of this decree, which will become effective upon publication of the regulations for its administration.—*Gazzetta Ufficiale del Regno d'Italia*, Rome, No. 99 (Straordinario), 1934; texts of previous legislation.

NEW YORK SEWAGE WORKS ASSOCIATION MEETS

THE Fall Meeting of the New York State Sewage Works Association will be held at Oneonta, N. Y., October 5 and 6.

ALABAMA HEALTH UNIT REOPENS

ACTIVITIES in the Coffee County Health Unit have been resumed, with the appointment of Dr. William A. Stanley, of Union Springs, Ala., member A.P.H.A., as Health Officer. The unit was discontinued Jan. 1, 1933, because of lack of county funds.

JESSEN PRIZE TO DR. BURKHART

THE International Dental Federation, at its meeting at Lake Como, Italy, August 1-4, 1934, elected the following associate members of The Commission of Oral Hygiene:

Miss Neveu, Paris; Mr. Fabres, Nice; Mr. Seniot, London; and Mr. Krikos, Athens.

The Jessen Prize was awarded to Dr. Harvey J. Burkhardt, of Rochester, N. Y., member A.P.H.A., to be presented at the 1935 meeting in Brussels.

DELTA OMEGA OFFICERS

AT the annual meeting of Delta Omega, the honorary public health society, held at the Hotel Maryland in Pasadena, September 6, 1934, there was an attendance of 39 from the six chapters and one honorary member, Dr. M. P. Ravenel. New officers elected were Professor Charles G. Hyde of California, President; Dr. Huntington Williams of Baltimore, Vice-President; and Dr. W. G. Smillie of Harvard, Secretary-Treasurer. The retiring President is Professor Ira V. Hiscock of Yale. It was voted to establish a new chapter at Columbia University. The present chapters are located in order of establishment at Johns Hopkins, Harvard, Massachusetts Institute of Technology, Michigan, Yale, and California. The membership of the Society is 515, including 9 honorary members.

MISSOURI WATER AND SEWERAGE CONFERENCE

THE Tenth Annual Missouri Water and Sewerage Conference will be held at Carthage, Mo., October 15 and 16.

DEATH

DEATH OF DR. HOLLINGWORTH

DR. Walter G. Hollingworth, of the Bureau of Health of Utica, N. Y., died September 2. He was a member of the Food and Nutrition Section of the A.P.H.A. from 1919, and became a Fellow in 1926.

PERSONALS

BERNARD S. COLEMAN, F.A.P.H.A., of Passaic, N. J., has been appointed Secretary of the Tuberculosis Division of the New York Tuberculosis and Health Association. Mr. Coleman was formerly deputy relief director of the New Jersey Emergency Relief Administration.

DR. WALTER L. BIERRING, of Des Moines, Ia., member A.P.H.A., was the guest of honor at a dinner September 4, at Los Angeles, Calif., sponsored by the Los Angeles County Medical Association.

CONFERENCES

- Oct. 5-6, Fall Meeting, New York State Sewage Works Association, Oneonta, N. Y.
- Oct. 8-10, Annual Meeting of the Association of Military Surgeons of the United States, Medical Field Service School, Carlisle Barracks, Pa.
- Oct. 15-16, Tenth Annual Missouri Water and Sewerage Conference, Carthage, Mo.
- Oct. 15-18, 17th Annual Meeting of the American Dietetic Association, Washington, D. C.
- Oct. 15-19, American College of Surgeons, Boston, Mass.
- Oct. 15-19, Annual Convention, New York State Nurses Association and its affiliated bodies, Buffalo, N. Y.
- Nov. 2, Mid-Year Meeting of the New York State Association of Public Health Laboratories, at the State Laboratory, Albany, N. Y.
- Nov. 13-16, Southern Medical Association, San Antonio, Tex.
- Nov. 16, 17, 60th Anniversary Meeting, New Jersey Health and Sanitary Association, Berkeley-Carteret Hotel, Asbury Park, N. J.
- Dec. 27-30, Annual Science Exhibition of the American Association for the Advancement of Science and Associated Societies, Pittsburgh, Pa.
- April 29-May 3, 1935, 19th Annual Clinical Session of the American College of Physicians, Philadelphia, Pa.

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Public Health in Tudor England*

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Huntington Library International Research Fellow*

IN studying the development of public health activities in 16th century England, we find that it runs parallel with and, in fact, is contingent upon the growth of a strong, centralized government under the Tudors. The attitude of the State, especially in the reign of that amazing ruler, Elizabeth, was an enlightened one, seeking to guard and foster the welfare of all of the people. We are apt to forget today that in Elizabeth's time government regulation of industry and of many phases of the life of the people was the accepted order. It is significant that from such a philosophy of government sprang many of our basic public health procedures.

Manifestations of this ideal are seen in the various efforts to better the sanitary and health conditions of the people, not only in attempting to control epidemics, but in aiming also to eradicate some of the fundamental factors in the cause and spread of disease. Housing plans were proposed to relieve the overcrowding of cities, pure food laws were passed, rules made to keep the streets

clean, and a commission appointed to regulate the disposal of sewage. All of these projects had the definite purpose of protecting and improving the health of the populace.

A Commission on Sewers had been established as early as the 15th century by Henry VI. It provided severe penalties for the pollution of streams, and these were enforced. Tanners and brewers were required to drain their waste into cesspools. Owners of swine had to provide suitable accommodations for their animals, and to take special precautions that there should be no drainage from the sties into neighboring streams. In connection with animals it is interesting to see that Henry VII recognized the menace to health from slaughterhouses and passed a law forbidding them within cities or towns, "lest it might engendre sicknes, unto the destruction of the people."

For many years there had been a statute that any one throwing dung or offal into the streets would be fined 40 shillings, a considerable sum in those days, and there is abundant evidence that this was enforced. At first the task of sweeping the streets was left to the householder, but later it became a municipal function and men were hired

* Read at a Joint Session of the Child Hygiene and Public Health Education Sections of the American Public Health Association at the Sixty-third Annual Meeting in Pasadena, Calif., September 3, 1934.

by the towns and cities for the purpose. The unsanitary conditions of streets was considered an important factor in plague epidemics, and rules for cleaning streets are embodied in the Plague Orders.

It was realized that pure and wholesome food was essential to health. As Elizabeth stated in a proclamation: "We must provide . . . foode, and other like necessities for mans life upon reasonable prices, without which no citie can long continue," and, as another proclamation says, "food should be good, sweete, sound, and wholesome for mans body." The standards and quality of food products were regulated by various laws, such as the *Assize of Bread*. The government proceeded strenuously against anyone selling bad or tainted food, and in one case the punishment certainly fitted the crime: any dealer who sold bad pork was to be put in the pillory in the market place and the rancid flesh burned in his face. The problem of adequate food supply in times of dearth was a serious one, and in 1577 John Dee, Queen Elizabeth's physician, suggested that the government establish stores of grain to meet such emergencies. This was done in a small way by various municipalities, and in 1623 James I carried it out on a large scale. One of the reasons he gives for his action will strike a sympathetic note today. He says: "The Kings most Excellent Majestie, observing that in times of dearth His loving Subjects (especially the poorer sort) are pinched with the great want and deere prices of Corne, and that the Treasure of the Kingdome, in those times is much exhausted, in providing Corne from foraine parts, and againe, that in times of plenty, the Farmour and Husbandman, by the low prices, and want of vent of their Corne, are hardly able to support their necessary charge nor the Landlord to uphold his rent." He hopes to stabilize prices by gathering stores in various parts of the kingdom, where, in

times of famine, corn will be sold at a fixed fair price.

The rapidly increasing population of London was a cause of great concern to the government, as it realized the dangers from disease in such a congested area. As Elizabeth herself put it, in a proclamation of 1580 against tenements: "Yet where there are such great multitudes of people brought to inhabitate in small roomes, whereof a great part are seene very poore, Yea, such as must live of begging, or by worse meanes, and they heaped up together, and in a sort smothered with many families of children and servantes in one house or small tenement, it must needes followe (if any plague or popular sicknes shoulde by Gods permission, enter amongst those multitudes) that the same would not only spread it selfe and invade the whole city and confines, as great mortalitie should ensue to the same." The aim of this law was to prohibit any new buildings within the city area, or the subdivision of existing houses into tenements.

Elizabeth's Stuart successors attempted to further these plans, but they met with vigorous opposition from selfish private interests, who put their own gain before the health of the community. Both James I and Charles I had very extensive schemes for city planning, regulating all phases of building. Among the proposals of Charles was this—"The windowes of every whole story to be of more height than breadth to the end the Roomes may receive ayre for health." In light of the recent survey of the present living conditions of the London poor, emphasizing the fact that large numbers still inhabit ill-lighted and unsanitary basement rooms, it is amazing to find that this law of Charles I prohibited cellars being used as lodgings. It is a sad commentary upon civilization that such far seeing plans were discarded under the *laissez faire* system.

However, the general efforts of Elizabeth did much to improve conditions, probably more effectively in the towns than in London itself, and I think it should be emphasized that the sanitary conditions of 16th century England were much better than we usually have been led to believe. J. H. Thomas, in an important recent work, "*Town Government in the Sixteenth Century*," has made a study of all phases of sanitation of some 12 English towns, and he says, "If a wider knowledge of town life as revealed by town *Records* refutes the view that towns remained filthy and entirely neglected by ignorant and irresponsible authorities, so must a fuller acquaintance with the little that is known about the origin of the diseases of the 16th century modify the opinion that town conditions caused those diseases." He compared the state of these towns in the 16th century with that in the middle of the 19th century, as revealed in the Royal Commission Survey of 1844-1845, and comes to the conclusion that in almost every respect the towns were cleaner and more healthy in the 16th century than they were in the 19th century. He says, "If some period in town life must be labelled as a time of in-sanitation, then the 19th century should be chosen."

One of the most important public health activities of the government was the control of epidemics. From the early part of the century the medical profession played a prominent part in this endeavor, through the College of Physicians. This had been founded in 1518 by Henry VIII on the advice of his physician, Thomas Linacre, and it is significant that from that very year date some of the most important public health measures, put into effect by the Privy Council, such as the isolation and marking of houses infected with plague, the isolation of clothes and goods of those dying of the plague, the first London Plague Orders, and the first

time Bills of Mortality are mentioned.

Considerable powers in matters of health were delegated to the College of Physicians, and also to the Barber-Surgeons Company, founded in 1540. Thus the College of Physicians had charge of the licensing of doctors in London and sought to curb the quacks and charlatans who preyed on the public. Since there was no such authority outside of London, a prominent physician, John Securis, suggested a strict licensing law for all physicians, surgeons, and apothecaries, on the basis of educational qualifications. On the advice of the College of Physicians, the apothecaries were taken out of the Grocers Company and set up as a separate company. From the appearance of most modern drug stores they seem to have gone back again. The apothecaries were required to adhere to the official *Pharmacopoeia* drawn up by the College. The proclamation ordering this move says it was done "out of Our Royall care for the health and preservation of our Subjects."

For control of the plague there were two sets of *Orders*, those for London and those for the country at large. In general, the provisions of these were much the same, although the organization differed. In London the Lord Mayor and the Aldermen were in charge, while in rural communities the Justices of Peace of a county, except those from infected areas, were to meet together, prescribe rules for the isolation of infected towns, and to put into effect the orders outlined by the government. The next provision in both of these *Orders* was a very necessary one, the raising of funds by taxation to meet the costs of the campaign. The government accepted the responsibility of relief in such a crisis. The money thus raised was to be used not only in general measures, but as the *Orders* themselves say "for the finding of victuall, or fire, or medicines for the poorer sort, during

the time of their restraint." Men were to be hired to examine all suspected patients in order to isolate all those infected and to obtain an estimate of the extent of the epidemic. The ministers, curates, and church wardens were to certify in writing the number of infected, and also of those dying within their parishes, with the probable cause of death. These findings were elaborated into the weekly and yearly Bills of Mortality. As such Bills apparently were used first in England, they mark the beginning of vital statistics.

Every house that contained one stricken with this dread disease was to be marked with a cross and the words "Lord have mercy upon us." Attempts were made to localize the epidemic and any infected person going abroad was treated as a felon. There were efforts made throughout the country to segregate plague patients in isolation hospitals. Sometimes these were rather makeshift dwellings outside the towns, but in 1592 a pesthouse was established in London.

Assemblies of people such as plays, bear-baitings, and fairs were forbidden. Sometimes the schools were closed. Preparations were made for the burial of the dead in a place apart. The clothes, bedding, and other goods of those dying or recovering from plague were usually burned, and the owner recompensed from the general funds.

At the end of the general *Orders* is a collection of remedies, "by the best learned in Physicke within this Realme . . . without charge to the meaner sort of people." The wealthy could afford to pay the doctor who cared for them during the plague, but poor people could not and the government provided such service. In 1583, in a translation of Ewich's *Of the Ductic of a Faithfull and Wise Magistrate*, it was suggested that the commonwealth hire physicians, surgeons, and apothecaries to deal with

plague patients. While this had been done sporadically, finally the College of Physicians put it into permanent practice, thus bringing into being the first Public Health Physician. These men were bound by oath to remain at their posts, and many died of plague. That their services were appreciated is shown by the provision for pensions to the widows of such doctors.

It would seem that everything humanly possible was done to combat the disease, along the lines of control measures. In spite of these efforts the plague continued its ravages, and in the more severe epidemics, as in 1603 and 1625, in each of which over one-sixth of the population died, the public became panic-stricken, and the system broke down. The rules could not be enforced, the dead were left unburied, and each one looked out for himself.

An element in increasing this state of panic was the teaching of certain religious fanatics that the plague was a sign of the wrath of God, that it was not infectious, and that to attempt to avoid it was an indication of a lack of faith in God. The government took a firm stand in this matter, and in the *Orders* there is a section forbidding persons "to utter such dangerous opinions upon payne of imprisonment." A number of preachers were thrown into jail for continuing to spread such doctrines.

The important lesson that may be learned from this experience of the past is the part that human frailty plays in the struggle against disease. Ignorance and fear can upset the most logical plan, and we have seen that when government became weak and lost its control, all the admirable efforts in housing and pure food regulations were sacrificed to selfish greed. Education can do much to overcome ignorance but also there must be courageous and strong leadership and a determined social-consciousness of the public.

Responsibilities of Health Authorities to Prevent the Spread of Syphilis*

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IT is our responsibility to stop the spread of syphilis wherever a barrier can be erected in its path. The logical position for the first barrier is in the field of prophylaxis. At the beginning of the present century Metchnikoff and Roux discovered and demonstrated beyond the possibility of doubt that the spirochete of syphilis may be killed upon the surface of the mucous membrane. Successful application of this discovery was made during the world war by the British Army which distributed prophylactic packets for self-disinfection and by the American Army which established centers for skilled disinfection. But neither of these systems has achieved any large measure of success in a civilian population. An English Committee of Enquiry on Venereal Diseases set up in 1923 reported: (1) that skillfully applied disinfection after intercourse would often prevent infection, (2) the success of any general public facilities for self disinfection is likely to be small, (3) that they could find no reason why people should not be allowed to purchase disinfectants for their own use and, therefore, (4) that the English

law should be altered "so as to permit properly qualified chemists to sell *ad hoc* disinfectants, provided that such disinfectants are sold in a form and with instructions for use approved by some competent authority."

During the last ten years no competent authority has been found willing to sponsor a set of instructions. Dr. Taliaferro Clark¹ reported for this country in 1931 that "in the states and cities in which prophylactic stations have been established they have been so poorly patronized that they have been given up." It still remains true that an ointment containing 33 per cent of calomel will, if thoroughly applied to the exposed surface within a few hours of exposure, prevent syphilitic infection. It should be applied if possible within 1 hour and in any case within 8 hours. I confess that the only use that I have made of this knowledge has been to urge upon certain of my audieces that if ever they find themselves in a position where they may have been exposed to infection they shall without delay, be it day or night, apply to a physician for prophylactic treatment. I hope that some of them have done so and that the physicians have received them cordially. My hope, however, is not very stout.

Treatment of contagious syphilis with arsphenamine or even with bismuth

* Read at a Joint Session of the American Social Hygiene Association and the Public Health Nursing Section of the American Public Health Association at the Sixty-third Annual Meeting in Pasadena, Calif., September 3, 1934.

rapidly renders it non-contagious. This fact provides us with our second barrier: indeed, with our Hindenburg Line. For if we fail at this barrier we shall lose the war.

The provision of free treatment in accessible and attractive clinics has been the main element in the British campaign against venereal disease since the war. Colonel Harrison² offers statistical evidence that there has been a slight decrease of syphilis in England and Wales. That the English scheme has failed to "eradicate" syphilis Colonel Harrison freely admits, and it will be profitable for us to examine the four main causes which, in his opinion, explain the failure: "(1) The inability of many of the infected to remain continent until pronounced cured. (2) The large numbers of persons who cease attendance too soon. (3) The imperfection of treatment centers. (4) The ignorance of many persons in the community that they are infected."

We need not perhaps take the first cause too seriously. Fortunately it is not necessary for the patient to remain continent during a 2 year course of treatment. It is possible for him or her to remain continent until no longer contagious. The second and third causes are removable, not without effort, and the fourth cause leads directly to another responsibility of health authorities which we must consider.

Before doing so let us note that in the rural districts and smaller towns of the United States treatment centers are not at all likely to succeed while the bulk of the organized medical profession is opposed to them. In England the situation is entirely changed by the operation of the National Health Insurance Act. Similar legislation would change the situation here, but until we have health insurance we must rely on the private treatment of a majority of our cases. This is a further handicap because it means that we have to per-

suade every practising physician to persuade each of his patients that inadequate treatment is more dangerous than no treatment at all. We must also exert ourselves that the practising physician be supplied with free drugs and at least a minimum fee from the public treasury; for he can hardly be expected to be enthusiastic in prolonging treatment when he has to bear all the expense thereof himself.

I have said that the ignorance of many people of the fact that they are infected leads us to another responsibility. We are responsible for making the discovery. We must find our cases of syphilis and find them early. We face no responsibility more urgent than this.

First we have the Wassermann test and the various other serological tests for syphilis. "The Utopian day has not yet come," says Dr. Moore³ "when every patient who consults a physician, for whatever cause, can have made a routine diagnostic blood Wassermann test. There are two types of patients, however, in whom the test should be made an absolute routine: (1) any patient in whom, for any reason, a general medical examination is made; (2) every pregnant woman."

Our recent survey experience in New Mexico has brought fresh evidence of the case finding possibilities of the routine Wassermann. A survey of a random sample of the population shows that we have some 21,000 cases of syphilis among the adults of the state. A census of all cases under treatment in the state on a given day shows 1,011 under medical care. The routine application of the Wassermann test can thus declare to us in our state about 20 times the number of cases that are actually known to us. When we consider further that almost 8 per cent of our adult population give positive reactions to the test (the percentage is higher in the cities, lower in the rural districts)

it must be obvious that it would be profitable to the doctors to avail themselves freely of this test. It is true that from the public health viewpoint many cases so discovered have passed the contagious stage.

In applying the test to pregnant women we are, on the other hand, sure that most positive cases will be both contagious and in the act of passing on the contagion. The study of 1,467 pregnancies in women with latent syphilis collected by the Coöperative Clinical Group shows that a syphilitic woman, untreated, has only 1 chance in 6 of bearing a live healthy infant, as compared with the normal woman's 3 chances in 4.⁴ We must therefore make the Wassermann test an integral part of every prenatal program.

I believe that the women's clubs should be made to share our responsibility in this respect. In addressing such organizations I have insisted that if their members, the most respectable members of the community, will insist on being given a Wassermann test each time that they become pregnant, then the obstetricians in that community will very soon make the test a matter of routine.

Other speakers will discuss in detail the methods of case finding. I am glad because I feel that this subject forms a fitting climax to this symposium. Let me say that I consider that Smith and Brumfield⁵ have completely proved their case that "it is practical to trace sources of infection and exposures in syphilis." On only two occasions did they find patients unwilling to name their consorts. The young people of this generation are ready to tell us. I am doubtful whether the doctors are equally ready to ask, although I agree with Dr. Smith that if the private physician will accept this responsibility nobody is better equipped to carry it through. H. W. Cummings⁶ has suggested that health authorities should

provide social workers to work with private practitioners as well as clinics in case finding. I would rather provide public health nurses who are, I believe, in a more strategic position than social workers.

I do not expect you to disagree with anything I have said up to this point. Now, however, I broach a questionable responsibility about which there is bound to be difference of opinion. People are always ready to quarrel on a subject about which they feel deeply, and people are always liable to feel more deeply, on a subject the less they know about it.

I approach the subject of sexual mores. To what extent is the incidence of syphilis determined by different kinds of sex behavior? To what extent, and by what methods can sex behavior be modified?

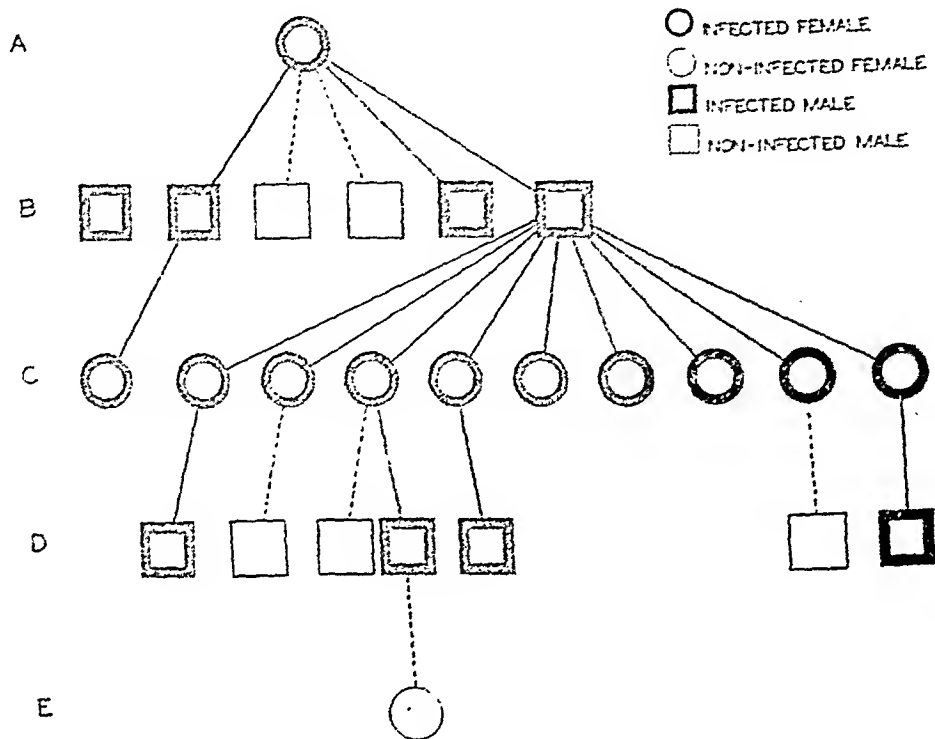
If you will look at the chart reproduced from the *Journal of Social Hygiene* for January, 1933, you will perceive that two individuals are especially responsible for the spread of syphilis in this little epidemic. The first is a prostitute, the second is a man of promiscuous sexual habits. This chart represents as good evidence as you will find that these two types of sex behavior tend toward the spread of syphilis.

Assuming for the moment that it is our responsibility to offer combat to prostitution and to promiscuity, there are two weapons offered to our hands: law and education. Let us examine the possibilities of each of these weapons in relation to each of these presumably undesirable social customs.

Historically the first method tried on the prostitute after the introduction of syphilis into Europe was abolition. An order of the town council of Aberdeen, Scotland, quoted by Taliaferro Clark¹ reads:

For the protection from a disease which came out of France and strange parts, all light women desist from their vice and sin of

HOW SYPHILIS SPREADS



A physician in a middlewestern city asked the State Health Department to trace the source of infection in 4 cases of fresh syphilis in his practice, all men (B). An investigation resulted which revealed 19 infections among 25 persons examined. Three of the original 4 men patients were infected by one woman, a prostitute (A). These men in turn infected 10 other women, 6 of whom were young girls (C). Four girls infected 4 other men (D). The fourth man (B) was traced to a different source.

DATA FURNISHED BY THE MINNESOTA DEPARTMENT OF HEALTH

Chart by A.S.H.A., New York

venery and work for their support on pain less of being branded with a hot iron on their cheek and banished from the town.

Nevertheless the light women did not desist from their vice and sin of venery.

Next an attempt was made to regulate the same vice with the object of isolating prostitutes from the general population and removing from the traffic those who were infected. Commonly but not universally it is agreed that "regulation" is a failure. In a recent review of the subject, Colonel Harrison⁷ maintains that in certain

circumstances regulation of prostitution can be effectual. Regulation proved successful under his direction when he abandoned all attempts to isolate infected women, assumed all prostitutes to be infected, and concentrated on measures designed to prevent the spread of contagion.

However, whether or not it is successful, regulation will always be opposed in countries with an Anglo Saxon tradition by those who reflect—

How oft the sight of means to do ill deeds
Makes ill deeds done.

The same Anglo Saxon tradition lends power to those modern health officers who have reverted to the method of the Aberdeen fathers. Of course police methods have been improved since the days of branding cheeks. One of our fellow authorities kept, and for all I know still keeps, a group of under-cover agents⁸ who live by double-crossing their friends in the trade. Under this system both prostitutes and police may well feel uneasy, and it is not difficult to accept the claim that "the whole procedure has worked a very severe hardship on the prostitution underworld." What one would like to know is whether this and similar repressive measures have decreased the incidence of syphilis. Being unable to answer this question I turned for help to the American Social Hygiene Association, and Mr. Johnson came very kindly to my rescue. He sent me a reprint of an article published some years ago⁹ in which he had marked the following paragraph:

Municipal policy toward prostitution has tended toward regulation and certain conditions have prevailed which are generally believed to have venereal diseases as an accompaniment. No statistical evidence has ever been available to show whether there was more or less infection under such a policy and under such conditions.

Mr. Johnson comments that "this situation still exists." What we did not know in 1927 we still do not know in 1934. Our first responsibility is perhaps to find out what effect legal repression of prostitution has on the incidence of syphilis and then to act in the light of our knowledge.

Before taking any action of this kind, however, do let us consider what effect it is going to have on our attempts to trace the transmission of syphilis from case to case.

Laws are also available for the punishment of those guilty of promiscuous sexual relations. More than that,

laws have been seriously recommended which provide a 6 months jail sentence for any extra-marital sexual relations whatever. The enforcement of such laws would certainly stamp out venereal disease. But does anyone imagine that they could be enforced? Col. P. M. Ashburn¹⁰ reported in 1927 that 54 per cent of 550 West Point students, ages 21 to 27 years, had had sex intercourse on an average of 23 times.

And again, if we make ourselves responsible for the enforcement of such laws, shall we be able to trace from case to case the transmission of syphilis. "Young man" we shall say, "if you will give me the names of all the girls with whom you have had any sex relations I shall, of course, have to see that they are sent to prison for 6 months, but I shall also see that the disease is thoroughly treated."

And once more, what do we really know of the influence of sex behavior on the incidence of syphilis?

Two years ago I had to address a group of sociologists. The above subject appeared to me one on which we might find common ground. In seeking material on which to base a discussion of this subject I was astonished as well as disappointed with the absence from sociological literature of any exact observations on the relationship between social behavior and the spread of the venereal diseases. I should have thought that sociologists would have been doubly interested in making such observations. In the first place a relationship having been established, objective records of pathology might be used as a clue to the sex-social organization of a given society. In the second place, the contribution of venereal disease to family disorganization and racial decay must surely be a matter of importance to sociologists. I take as an example the work of Rivers¹¹ among the Todas of British India. He writes:

There seems to be no doubt that there is little restriction of any kind on sexual intercourse . . . instead of adultery being regarded as immoral, I rather suspected, though I could not satisfy myself on the point, that according to the Toda idea, immorality attaches rather to the man who grudges his wife to another. . . .

So far as I could tell, the laxity in sexual matters is equally great before and after marriage.

Here then we find in practice the kind of sexual behavior at present advocated by Dora and Bertrand Russell. Would it not be of exceptional interest to know something about the incidence of venereal disease in such a community? But not a single observation bearing on this subject can I find.

With other similar studies I had practically the same experience. Malinowski¹² in a two volume report on the Trobriand islanders mentions incidentally one epidemic of acute gonorrhea which was useful to his study, but gives no other clue as to the incidence of venereal disease among these peoples to whom adolescent promiscuity appears as normal and proper recreation.

My paper grows too long and I have as yet said nothing about education as a method of controlling sex behavior. Those most familiar with my checkered past will know me as an ardent advocate of sex education. But more and more I wish to dissociate sex education from the campaign against syphilis. The object of sex education must be positive, constructive, never inhibitory. I do not want my students to feel that I am lecturing them into some accepted moral code. I want them to know that I am helping them to knowledge born of experience and experiment; that I expect them to fashion from it their own philosophy of life. The facts of venereal disease should be only a minor portion of this knowledge.

I do not deny that such education is likely to diminish the incidence of syphilis, but I do not know, and as a sex educator it is not my main concern. And I recognize, of course, that the facts about syphilis belong in the forefront of any campaign of popular health education.

SUMMARY

A knowledge of the possibilities of prophylaxis should be widespread and physicians should be prepared to give prophylactic treatment to those who ask for it.

Our main responsibility is to find cases early, to bring them under treatment, and to keep them under treatment until cured. The barrier of early and complete treatment is essential to the control of syphilis, and careful epidemiology is essential to the erection of this barrier.

Research is urgently needed on the relationship of sex-social behavior to the incidence of syphilis. Accurate morbidity statistics will greatly aid such research.

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Epidemiological Value of Isolating Bacteriophage in Outbreaks of Intestinal Infection *

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THE bacteriophage has been largely a laboratory curiosity and a subject for controversy and speculation. The principal attempt to make use of it in a practical way has been as a curative agent, upon which opinions differ. Other useful applications of the phenomenon no doubt await discovery when more information is accumulated. With the purpose of determining whether there might be any public health applications of the phenomenon, a study was begun in 1932, undertaken largely because of the success with which the isolation of bacteriophage was applied in an outbreak of bacillary dysentery in a large institution (Medfield), the main features of which are reported in a paper now in press.¹

In this epidemic it appeared that finding a bacteriophage in the stools from those affected which was active against the bacillus causing the disease was a useful means of aiding to differentiate these cases from those due to other causes. Stool cultures had proved unreliable for 2 reasons: (1) The bacillus was soon eliminated from the intestine, and when there was delay in obtaining specimens no organism was cultivated from them; (2) Specimens

had to be mailed to Boston for examination, and even stools obtained at the proper time were often negative. The epidemic had begun early in the summer in one ward. A Hiss-Y dysentery bacillus was recovered from one patient but not from others. Isolation and general sanitary measures caused an abrupt cessation of cases.

Six weeks later the infection appeared again, this time in most of the buildings of the institution. During the second outbreak over 90 stools from clinical cases were examined, and from only 6 was the dysentery bacillus obtained. At the same time 81 stools were examined for bacteriophage and 29 were found positive. The figures are more striking when divided into groups according to the week of the disease. During the first 7 days bacilli were found in 28 per cent of the specimens examined, while bacteriophage was found in 33 per cent; during the second week bacteriophage was found in 80 per cent and bacilli in 13 per cent; during the third week bacteriophage was found in 45 per cent of specimens and bacilli in none. Thereafter neither was found with any regularity. Stools of individuals not affected did not contain bacteriophage. The bacteriophages isolated in this outbreak were active against all members of the Flexner group, as well as the Sonne and Shiga bacilli.

* Read before the Laboratory Section of the American Public Health Association at the Sixty-third Annual Meeting in Pasadena, Calif., September 6, 1934.

Meanwhile an urgent necessity for finding other means of gaining information as to the etiology of outbreaks of gastroenteritis was felt. Such outbreaks are perhaps the most frequent variety that the epidemiologist is called upon to investigate, and in many instances, due to the short duration of illness, he does not arrive until the peak has passed and a majority of the cases are in the convalescent stage. Under such circumstances determination of the etiological agent is difficult. Stool cultures are unsatisfactory because in most instances no suspicious organism is isolated. Even if one or two stools yield some organism which might be responsible, it is difficult to prove that the other cases have been caused by the same agent. Agglutination tests cannot be entirely depended upon, since some individuals may have agglutinins from previous attacks or sub-clinical exposures to the organism.

Since bacteriophage active against the invading organism has been demonstrated repeatedly in the stools of individuals suffering from illness due to various types of intestinal pathogens, it seemed that isolating bacteriophage from the stool might give some light as to the cause of an illness. Since the bacteriophage usually appears in the stool during the convalescent stage, the method would have the advantage of

providing evidence long after the expectation of isolating the bacterium had passed. It was decided, therefore, to filter stools from these epidemics and set them up against a number of intestinal pathogens.

The usefulness of the procedure would depend upon several factors: (1) the chances of picking up a bacteriophage which had no relation to the outbreak; (2) the specificity of those isolated; (3) the regularity with which bacteriophages are recoverable from those ill, in contrast to those not affected.

In order to check up on the first factor, samples were collected from many sources, filtered, and placed in contact with a group of the more common intestinal bacteria. The bacteriophages isolated from these sources are summarized in Table I. It will be seen that except in sewage samples they are relatively rare. The chances of a single individual picking up a bacteriophage might be of some significance, but the chances of several individuals simultaneously picking up the same one would be quite small. That such is the case is indicated by the failure to find them in a large number of stools examined from persons involved in various outbreaks which have been studied not due to the dysentery bacillus.

When we turn to the specificity of the

TABLE I
BACTERIOPHAGES ISOLATED FROM VARIOUS SOURCES IN MASSACHUSETTS

Bacteriophages Isolated Active Against

Source of Specimen	Total Specimens Examined	<i>B. typhosus</i>	<i>B. paratyphosus A</i>	<i>B. paratyphosus B</i>	<i>B. dysentery (Shiga)</i>	<i>B. dysentery (Flexner)</i>	<i>B. dysentery (Flex-I)</i>	<i>B. dysentery (Shiga)</i>	<i>B. enteritidis</i>	<i>B. coli communis</i>	<i>Staphylococcus</i>
Stools*	111	6	1	0	10	9	10	6	5	2	1
Sewage	89	34	11	11	52	42	51	39	20	30	4
Rivers	116	1	0	2	6	3	10	5	0	6	4
Lakes and ponds	70	0	0	0	4	2	0	1	0	3	3
Beaches (sea water)	44	0	0	1	5	0	1	2	0	0	0
Public water supplies	7	0	0	0	1	0	2	2	0	0	0
Total	437	41	12	14	78	56	74	55	25	41	12

* None of these stools were from dysentery outbreaks.

bacteriophages we find that they can be divided into several rough groups:

1. Those active against *B. typhosus* only
2. Those active against the Flexner dysentery group
3. Those active against all dysentery bacilli, including Shiga and Sonne
4. Those active against *B. typhosus*, *B. dysenteriae* (Shiga), *B. dysenteriae* (Sonne), and *B. enteritidis*
5. Those active against all of the group of intestinal pathogens used
6. Those active against *B. coli*

Not all can be placed in the above groups as there are considerable variations in valence. No doubt mixtures of bacteriophages were dealt with in some cases, particularly from sewage samples, but repeated platings of some of wide valence (Group 5) and isolations from plaques failed to narrow the valence. Perhaps more persistent efforts will reveal that some of them are mixtures.

Another fact which stood out conspicuously was that the colon bacillus was very seldom included in the valence of bacteriophages isolated with the intestinal pathogens. Frequently a colon bacteriophage was isolated from the same specimen that contained other phages, but it was usually quite specific for the colon bacillus, and the others did not often attack the colon bacillus. Most observers have remarked upon the regularity with which Shiga bacteriophages attack the colon bacillus, but this has not been true in the present study. The explanation is not yet apparent.

This irregular and wide valence adds uncertainty to the interpretation of isolations from stools until several are found and shown to be the same variety in different individuals in the same epidemic. In order to demonstrate that they are the same, it is necessary to determine their valence against a list of the commoner intestinal pathogens.

It has already been shown that bacteriophages are recoverable with great regularity from patients convalescing

from bacillary dysentery and are absent from stools of those not affected. Whether this is true of other intestinal infections awaits demonstration.

Meanwhile outbreaks of gastroenteritis were occurring and attempts to make use of the method were being tried. Most of the outbreaks were mild to moderately severe diarrheas occurring in short, sharp epidemics, in contrast to the more drawn out course of bacillary dysentery in an institution. Those affected were not prostrated and few or none showed blood or mucus in the stool (see Table II). Stool cultures yielded an occasional organism not easily classified and also an occasional bacteriophage active against some of the pathogens used in the search. The same bacteriophage could not be recovered from a sufficient number of individuals to be significant, nor were those isolated ever active against the organisms found in the outbreaks. Either the intestinal disturbance was due to organisms not included in the list used, or the attacks were so mild that bacteriophages did not appear in the stool. We must not lose sight of the fact that some strains of bacilli are not susceptible to lysis by bacteriophage, though it does not seem plausible that all of the occasional organisms isolated from stools in these outbreaks could have happened to be insusceptible to lysis.

During one season semi-monthly samples were collected from 3 popular beaches near Boston during the spring before the bathing began, and weekly samples during the summer months. The plan was to examine these for bacteriophages to discover the usual ones present with the expectation that a new one might appear if an intestinal outbreak should occur among those frequenting the beaches. One hundred families at each beach were visited regularly and 273 physicians in the communities where the beaches were located agreed to report any intestinal disorders

TABLE II

OUTBREAKS OF INTestinal INFECTION

Outbreak	Type	Population Involved	Cases	Causative Agent	Probable Mode of Spread	Character of Symptoms	Number of Specimens Examined	Isolation of Bacteriophage Useful
Medfield	Institutional	2,100	100	<i>B. dys.</i> (Miss-Y)	Contact and carriers	Violent diarrhea, fever mucus, blood	81	Yes
Williamsburg	Community	1,800	200	Not determined	Water	Purging, no mucus or blood	13	No
Fall River	Family	8	6	Not determined	Food	Purging, no mucus or blood	8	No
Westfield	Institutional	350	36	Not determined	Unknown	Vomiting, purging	45	No
Plymouth	Family	6	4	Not determined	Unknown	Vomiting, purging	6	No
Worcester	Family	7	5	<i>B. dys.</i> (Miss-Y)	Food	Violent diarrhea, mucus and blood	6	Yes
Medfield	Institutional	2,100	500	Not determined	Food	Mild purging	19	No
Northfield	School	2,000	100	Not determined	Water	Mild purging	6	No
S. S. Columbian	Ship	50	40	Not determined	Food	Mild purging	15	No
Northampton	School	1,500	100	Not determined	Food	Mild purging	11	No
Fall River	Community	110,000	500	Not determined	Water	Mild purging	12	No
Danvers	Institutional	3,000	61	<i>B. dys.</i> (Miss-Y)	Contact	Violent diarrhea, mucus and blood	65	Yes
Waverly	Institutional	2,000	156	<i>B. dys.</i>	Contact and food	Severe diarrhea, mucus and blood	47	Yes

which occurred. It happened that there was no outbreak among the groups studied during the season. Not even a single case of severe diarrhea was reported. The only information obtained, therefore, was the normal bacteriophage content of the waters of the beaches.

An outbreak in a family in Worcester,

tailed figures are not yet available. The percentages given include examinations of samples from all cases of diarrhea occurring during the outbreaks, some of which were certainly not due to the dysentery bacillus. In isolating bacteriophages in these 2 outbreaks 2 markedly susceptible strains

TABLE III
DYSENTERY BACILLI AND BACTERIOPHAGES ISOLATED FROM STOOLS
DANVERS OUTBREAK

Week after onset	Dysentery Bacilli			Bacteriophages		
	Specimens examined	Number positive	Per cent positive	Specimens examined	Number positive	Per cent positive
1	47	18	38.4	14	8	57.3
2	28	6	21.4	6	4	66.7
3	28	2	6.7	4	2	50.0
4	24	3	12.5	14	8	57.3
5	29	1	3.3	8	4	50.0
over 5	39	0	0	11	5	45.4
	195	30	13.4	58	32	55.2

however, presented the same situation as in the institutional outbreak mentioned above. Three children were sent to a hospital with a very severe diarrhea. A dysentery bacillus was isolated from the most recent case. Bacteriophages were recovered from the stools of the other 2 children, and at a later date one was found in the stool of the child from whom the organism was isolated. Stools from 2 other children who had had mild attacks were examined and a bacteriophage was found in one. Here again isolation of bacteriophage aided in proving conclusively that all the children were suffering from the same illness.

During this summer outbreaks of bacillary dysentery occurred in 2 other institutions. In an outbreak in Danvers 13.4 per cent of the specimens examined for bacilli yielded a Hiss-Y dysentery bacillus and 55.2 per cent of the specimens examined for bacteriophage were positive. The percentage by weeks is shown in Table III. In an outbreak in Waverly bacilli were found in 10.7 per cent of the samples examined and bacteriophages in 49 per cent. This last outbreak occurred so late that more de-

were used as well as a strain isolated from each institution. Several bacteriophages were obtained which would have been missed if the 2 stock strains had not been used. All of the bacteriophages were shown to be active against the organisms isolated from the institutions. Some of the dysentery bacilli isolated were found to be insusceptible to lysis by the bacteriophages at hand.

DISCUSSION

It was a considerable source of disappointment that isolation of bacteriophages failed to be of aid in studying the more elusive epidemics of intestinal infection usually encountered. The fact that the method can be applied to bacillary dysentery, while interesting and of value in certain instances, is not so useful since the usual methods of studying such outbreaks are more satisfactory. However, it is not unlikely that by increasing the list of organisms used in testing, or by some other variation, the method may yet be made to yield information in such intestinal disturbances.

In making isolations from dysentery cases it is recommended that one or two

markedly susceptible strains of bacilli be used until it is ascertained that an organism recovered from a case in the outbreak will pick up bacteriophages from all stools in which they are present.

METHODS USED

Except for the time consuming operation of filtering through a Berkefeld filter, isolation of bacteriophages is no more complicated than isolating bacteria. Some of the ways of simplifying filtration were reported in a recent paper.²

COLLECTION OF SPECIMENS

The specimens should be collected without any differential or inhibiting fluid such as used in typhoid and other culture outfits. A satisfactory method is to saturate thoroughly and cover the cotton swabs in a diphtheria culture outfit. Drying does not appear to inactivate the bacteriophage at this stage.

ISOLATION INVOLVING FILTRATION

The simplest method of isolation is to place 5 to 10 c.c. of plain broth in contact with not more than 1 gm. of feces and after 15 to 30 minutes decant into a Berkefeld filter and pass through an "N" candle. To a tube of broth, seeded lightly with the organism causing the outbreak or with a stock strain, add 0.5 c.c. of the filtrate from the stool and incubate 18 to 24 hours. A control tube containing only the organism should be set up. If a strong bacteriophage is present, the tube containing the filtrate may be clear while the control will be turbid. If the bacteriophage is weak, no clearing may appear, in which case it is necessary to make sure no bacteriophage is present. There are 3 methods by which this may be done.

1. The most accurate method of checking up on doubtful tubes is to transfer 0.05 c.c. to an 18 hour broth culture of the organism, thoroughly mix,

and then smear 0.1 c.c. evenly over the surface of an agar plate. This is best done with a bent glass rod sterilized by dipping in 95 per cent alcohol 2 or 3 times—each time allowing the alcohol to burn. The inoculating culture should be heavy enough to produce a complete film of growth, with no separate colonies visible. If bacteriophage is present, plaques will show in the bacterial film on the surface of the plate. Sometimes, however, a very active bacteriophage may completely inhibit growth, and there will be practically no colonies on the plate.

2. Another method is to smear a loopful of broth from the doubtful tube and another loopful from the control, each on separate spots about 1 cm. in diameter or larger on an agar plate. Lysis will be indicated by (1) no growth; (2) a scanty growth; or (3) plaques in the bacterial film. The amount of reduction in growth can be determined by comparing with the control.

3. The third way to check up on tubes showing no clearing is to seed thoroughly the surface of an agar plate with the organism. Then with a loopful of material from the tube make a circle on the surface of the agar. Make one also with the control for comparison. If bacteriophage is present, it will be indicated on the ring by more or less inhibition of growth of the organism or by a few well defined plaques. Usually the bacteriophage particles are much more numerous at 18 to 24 hours than the resistant organisms which have begun to grow out, and the latter do not interfere materially in interpreting the results on the plates.

ISOLATION WITHOUT FILTRATION

It is possible to isolate bacteriophages without filtering the material from the stool through a Berkefeld filter. The percentage of isolation will not be high, however, since only the most active ones

will be recovered in the presence of the rapid growing and spreading bacteria or of the spore forming organisms which will be encountered in stools. The stool specimen should be placed in contact with broth as outlined above, and 0.5 c.c. of the broth placed in an 18 hour broth culture of the organism causing the outbreak. After 12 to 24 hours incubation, the tube is placed in a water bath and the temperature held at 60° C. for ½ hour. This will usually kill the vegetative bacteria and not harm the bacteriophage. A very small loopful of the material is then placed in an 18 hour broth culture of the organism and immediately plated out as described above. The presence of bacteriophage will be shown by plaques or by complete inhibition of growth.

SPECIFICITY OF BACTERIOPHAGES

The bacteriophages isolated in this study were brought to full activity by serial transplanting in broth cultures of the susceptible organism and then filtering. The filtrates were placed in contact with the organisms named in Table I plus the 5 English strains of Flexner dysentery bacillus (V, W, X, Y, and Z). One drop of filtrate and 1 drop of broth culture of the organism is placed in a tube of broth. Controls receive only the organism.

A great deal of labor was saved by using special metal battery boxes, each holding two rows of 10 tubes each. These were modified from similar ones described by Wells,³ the principal change being to leave the lower 2 inches of the tubes exposed instead of the middle, and to increase the number of tubes from 10 to 20 per box. These boxes eliminated handling cotton plugs when filling the tubes as well as when inoculating them. One row of tubes can be lifted up with a special lifter while observing the other. In using the boxes a separate row was used for each organism, 9 tubes receiving bacterio-

phages and the 10th being left as a control.

Another time-saving apparatus was devised to fill the tubes of broth more rapidly. It consists of a glass syringe and a special valve connected with a reservoir which automatically measures out the proper amount of broth when a tube is pushed against the bottom of the valve.

The tubes were left at room temperature for 18 to 24 hours. Incubation at 37° C. causes the resistant organisms to grow out more rapidly, and frequently tubes which have cleared within 6 to 12 hours will again become turbid by the end of 24 hours. At the end of 24 hours all tubes and controls were plated out on agar in numbered squares corresponding to the numbers of the tubes in the protocol. Sixteen to 20 squares can be marked off on a plate. An area about 1 cm. in diameter is evenly covered with a small loopful from each tube. Frequently bacteriophages are found on the plates which would have been missed because of failure of the broth tubes to become clear.

SUMMARY

In outbreaks of bacillary dysentery bacteriophages active against the organism causing the outbreak were isolated from the stools of 60 to 80 per cent of those showing clinical symptoms, when stools were obtained during the second week after onset.

In outbreaks due to other causes bacteriophage isolation did not yield any useful information.

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NOTE: Laboratory facilities and technical assistance for carrying on this study were made available through the courtesy of Dr. W. G. Smillie, Harvard School of Public Health.

Outbreak of Milk Poisoning Due to a Toxin-Producing Staphylococcus Found in the Udders of Two Cows*

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SO far as the authors are aware, Barber (1914) first suggested that a toxin-producing staphylococcus was responsible for cases of food poisoning, when he described cases of gastroenteritis which had occurred from time to time (1909-1913) on a certain farm in Nueva Ecija Province, Luzon, P. I., and attributable to the ingestion of improperly refrigerated milk which contained staphylococci in abundant quantities.

During the past three or four years outbreaks of food poisoning due to staphylococcus "enterotoxin" have been reported by a number of investigators, notably Jordon, and indeed the splendid work of Jordon and his associates has stimulated a widespread interest in the problem.

This report refers to a series of outbreaks of acute food poisoning occurring at Pleasant Hill Academy, Pleasant Hill, Tenn., from time to time during the period July 27-October 20, 1933.

Pleasant Hill Academy is a prepara-

tory school operated under the auspices of the American Missionary Association, and situated on the Cumberland Plateau in Cumberland County, Tenn., 90 miles west of Knoxville and 120 miles east of Nashville.

The school owns a farm of several hundred acres. A herd of 13 cows supplies all of the milk. Practically all of the labor at the school is done by the students. They work on the farm, cook, wait on table, fire furnaces, do janitor work, and operate the laundry.

The principal and his family reside in a separate house on the school campus, and the farm-manager occupies an apartment in one of the dormitories, and for these two families meals are prepared and served within their respective homes. The remainder of the faculty members and all of the resident students live in the dormitories and eat in one dining room, the arrangements being such that one faculty member is placed with each table of students. Thus, with the exception of the principal and farm-manager, the faculty and student body have the same food supply.

During the period June-August, 1933 (school vacation), the only persons who lived on the school premises were the

* Read before the Epidemiology Section of the American Public Health Association at the Sixty-third Annual Meeting in Pasadena, Calif., September 5, 1934.

families of the principal and the farm-manager and 2 students who helped with the operation of the farm and dairy, these students staying in the dormitory and boarding with the farm-manager.

On July 27, 1933, cases of acute poisoning occurred in all of the 6 members of the household of the farm manager, including the 2 students. Clinically, the cases were characterized by acute and sudden onset of nausea and vomiting, and in some instances prostration. Purging and diarrhea did not occur in these cases, but were prominent symptoms in later outbreaks. All cases were reported to be afebrile, and recovery rapidly followed emptying of the stomach. All of the cases had onset within 15 minutes of each other, the time being about 10 a.m., or approximately 3 hours after breakfast.

School opened during the last week of August, 1933, when 88 resident students enrolled, and these, with 9 faculty members, made a total resident population of 97, ranging in age from 14 to 54 years, and including 51 females and 46 males.

On September 4, 1933, the second outbreak occurred involving 45 cases, all having onset at about 9 p.m., or approximately 3 hours after the evening meal. In this and in all subsequent outbreaks no cases occurred in the family of either the principal or the farm-manager. Subsequent outbreaks occurred on September 13, 20, 27, October 2, 10, and 20.

It is interesting that the 7 outbreaks which occurred following the opening of school were rather evenly distributed with respect to time, the intervals between successive outbreaks ranging from 7 to 10 days.

A total of 242 cases occurred, 233 in students and 9 in faculty members. Students suffered an attack rate 2.9 times that of faculty members, the rate for the former being 2.9 cases per person and for the latter 1 case per person. In 2 of the outbreaks the approximate hour of onset of cases was 9 p.m. and for the remaining 5 was 10 a.m.

Table I shows for each of the 7 outbreaks the date, the approximate hour of onset of the cases, and the number of

TABLE I

DATES OF OUTBREAKS OF FOOD POISONING, APPROXIMATE HOURS OF ONSET OF CASES, AND NUMBER OF CASES WITH CASE RATES IN STUDENTS AND FACULTY MEMBERS AT PLEASANT HILL ACADEMY, TENN.—SEPTEMBER 4–OCTOBER 20, 1933

Date of Outbreak	Approximate Hour of Onset	Number of Cases			Case Rate (=100)		
		Students	Faculty	Total	Students	Faculty	Total
Sept. 4	9 P.M.	44	1	45	50.0	11.1	46.4
" 13	10 A.M.	30	2	32	34.0	22.2	33.0
" 20	10 A.M.	15	0	15	17.0	—	15.5
" 27	10 A.M.	25	1	26	28.4	11.1	26.8
Oct. 2	9 P.M.	34	2	36	38.6	22.2	37.0
" 10	10 A.M.	16	0	16	18.2	—	16.5
" 20	10 A.M.	69	3	72	78.5	33.3	74.5
Total		233	9	242	290.0	100.0	250.0

cases with case rates in students and in faculty members.

The explosiveness of the outbreaks, with all cases having onset within 15 to 30 minutes of each other, indicated that the etiologic agent was transmitted from a common source; and the consistency with which onset of cases occurred 3 hours following a meal further indicated that food was the most probable vehicle.

The absence of temperature, the abrupt and violent onset, the short duration, and rapid recovery without material after-effects all tended to indicate that the illness was due to a toxemia or poisoning rather than an infection.

The cases were not reported to the State Health Department until October 3, on the morning following the 5th outbreak. Investigation was made by one of us (J. A. C.) at that time, when epidemiological case records were obtained for all of the cases which had occurred previously. Subsequent cases were investigated within less than 24 hours following onset.

In the students the distribution of cases with respect to sex and age was in no way unusual. In the faculty members, the numbers were too small to justify comparisons.

Since a total of 242 cases occurred in 97 persons, it would follow that a number of persons suffered repeated attacks. The distribution of persons according to the number of attacks is shown in Table II.

TABLE II

DISTRIBUTION OF ATTACKS

Number of Attacks	Number of Persons	Per cent of Total
5	12	12.4
4	16	16.5
3	19	19.6
2	26	26.8
1	9	9.3
0	15	15.4
	97	100.0

Because of the practice of the school of assigning one faculty member for each group of students at a table, both students and faculty members ate the same food, which was served and prepared by the same people.

Information was obtained as to the various articles of food consumed by each of the 97 persons at the meals immediately preceding onset of the cases.

With the exception of milk, no article of food eaten during these meals appeared more frequently in the diet of those ill than of those not ill.

Table III shows for each of the outbreaks the number of cases, and case rate in persons who drank milk during the meal immediately preceding onset of cases, and for comparison the attack rate in those who did not drink milk.

Out of the 242 cases, all but 1 occurred in persons who had drunk milk during the meal immediately preceding onset. The attack rates in milk consumers varied from 17.6 per cent on September 20, to 81 per cent on October 20. In view of subsequent data which clearly established the fact that milk was the vehicle of the causative agent, it is quite likely that for the case occurring in the person who denied drinking milk, either the history was unreliable, or perhaps the illness may have been of another nature.

Following the outbreak of October 2, fecal specimens from all of the 37 persons who were in any way connected with the handling of food were examined for the typhoid, dysentery, and salmonella group of organisms with entirely negative results.

Following the outbreak of October 20 all articles of food served at the meal immediately preceding onset, and also pooled specimens of first vomitus of the patients were examined both bacteriologically and chemically. In addition, specimens of throat secretions from all of the food handlers were immediately streaked on rabbit blood-agar plates and

TABLE III
CASES OF FOOD POISONING AND ATTACK RATES IN PERSONS WHO:
(A) DRANK MILK AT THE MEAL PRECEDING ONSET
(B) DID NOT DRINK MILK AT THE MEAL PRECEDING ONSET

Date of Outbreak	Drank Milk at Meal Preceding Onset			Did Not Drink Milk at Meal Preceding Onset		
	No. Persons	Cases		No. Persons	Cases	
		Number	Attack Rate (=100)		Number	Attack Rate (=100)
Sept. 4	85	45	53.0	12	0	0.0
" 13	89	32	36.0	8	0	0.0
" 20	85	15	17.6	12	0	0.0
" 27	88	25	28.4	9	1	11.1
Oct. 2	83	36	43.4	14	0	0.0
" 10	88	16	18.2	9	0	0.0
" 20	89	72	81.0	8	0	0.0

brought into the laboratory for bacteriological examination. The articles of food included cereal, sugar, toast, coffee, milk, bacon, scrambled eggs, apple sauce, and butter. The chemical examination* included a search for arsenic, lead, strychnine, mercuric chloride, barium and antimony salts, phosphorus, and various alkaloids. Results of chemical analyses were entirely negative.

In the bacteriological examination, each article of food and the vomitus were examined directly by stained smear (Gram) and a loopful was planted for culture on plates of plain agar, Endo's, eosin-methylene blue agar, and 3 per cent rabbit blood-agar.

All of the articles of food except milk contained only very few bacteria, and these were of various types.

From the milk and the vomitus, hemolytic staphylococci were obtained

in enormous numbers and practically in pure culture. The staphylococci were decidedly hemolytic and were of both the albus and aureus types, the ratio of aureus to albus being about 40 to 1.

Of the 37 food handlers whose throat secretions were planted on rabbit blood-agar plates, 12 showed large numbers of hemolytic staphylococci, both aureus and albus, the aureus predominating in a ratio of 50 to 1. Incidentally, all of these 12 persons had suffered attacks of poisoning less than 24 hours before the specimens were obtained. These 12 persons were reexamined at 3 day intervals during the following 3 weeks, and in all of them the organisms had disappeared apparently by the end of this time. Each succeeding examination showed a diminished number of organisms, and in all but 3 persons, results of examinations were negative at the end of 12 days.

The staphylococci recovered from the milk, the vomitus, and the throat secretions of the food handlers were tested for production of toxic products, the

* Chemical examinations were made by Dr. J. W. Sample, Chief Chemist, Tennessee State Department of Agriculture, Nashville.

technic employed being that described by Woolpert and Dack (1933).

In testing for the presence of enterotoxin substance in the filtrates from these organisms only human volunteers were employed. Three c.c. of filtrate in approximately 3 ounces of pasteurized milk were given to persons who had not eaten any food for more than 5 hours. Where illness followed the ingestion of these filtrates, the incubation period was shorter (though somewhat variable for different filtrates), and symptoms were less severe, but otherwise clinically identical with those occurring in the outbreaks.

Although a sufficient number of human volunteers could not be obtained to test all of the filtrates that were prepared, some of the organisms recovered from the milk, the vomitus, and the throat secretions of the food handlers were tested.

The yellow staphylococci recovered from the milk, the vomitus, and from 5 of the 12 food handlers proved to be toxin-producers, the filtrates producing illness in all of the human volunteers. Filtrates from the organisms isolated from the milk and the vomitus produced symptoms within 30 minutes, but those from the 5 food handlers produced illness with incubation periods ranging from 1½ to 3 hours.

In these tests, 8 persons were used as controls, these being fed milk and sterile media, and none of them became ill.

All epidemiological evidence, supported by bacteriological findings, indicated that milk was the most probable vehicle of the "enterotoxin." However, it was necessary to determine the source of the organisms which apparently produced the "enterotoxin"; *i.e.*, whether the secreted milk itself contained the organisms, or contamination occurred through handling of the milk by one or more infected food handlers. The latter possibility was suggested by the fact that 12 of the food handlers

were found to harbor the organisms in their throats.

Beginning October 23, specimens of milk were obtained under as nearly aseptic conditions as possible from each of the 13 cows, at a rate of 3 specimens per week (every other day) for a period of 5 weeks. During this period, specimens from 2 cows (Nos. 2 and 7) showed almost consistently a large number of hemolytic staphylococci. Specimens from 4 other cows occasionally showed the organisms, but filtrates from these when fed to human volunteers failed to demonstrate enterotoxin substances in 50 c.c. amounts.

Of the 12 specimens from cow No. 2, 9 contained hemolytic staphylococci, and from Cow No. 7, 12 of the 15 specimens were positive. Both the aureus and albus types were found in the milk from each cow, the aureus predominating in proportions, ranging from 25 to 1, to 60 to 1. Filtrates from the albus produced no symptoms when fed in 50 c.c. amounts to human volunteers. Filtrates from 7 different aureus cultures produced illness in 12 of 15 human volunteers when fed in 3 c.c. amounts.

The number of organisms to the c.c. of milk from cow No. 2 averaged about 2,900, and from cow No. 7, about 4,500. One specimen showed a count as high as 17,500, while others contained only a few. A negative specimen would usually be followed by a tremendous increase to the maximum bacteria count. Table IV shows the results of examinations of the various specimens of milk taken from cows Nos. 2 and 7 over the 5 week period.

Evidently somewhere in the udders of these 2 cows there were pus pockets which would occasionally break loose, producing a "showering" of staphylococci, followed by a gradual diminution in number of organisms for a time, after which another "showering" would take place. This recurrent "showering" of organisms is of particular in-

TABLE IV
RESULTS OF EXAMINATIONS OF SPECIMENS
OF MILK TAKEN FROM 2 COWS AT
PLEASANT HILL ACADEMY, TENN.,
OVER THE PERIOD OCTOBER 23
TO NOVEMBER 27, 1933

Date	Number of Hemolytic Staphylococci per Cubic Centimeter of Milk	
	Cow Number 2	Cow Number 7
Oct. 23	2,500	1,500
" 25	1,500	200
" 27	100	0
" 31	50	0
Nov. 3	5	17,500
" 5	0	14,200
" 8	0	5,000
" 10	14,000	1,000
" 13	8,000	75
" 15	5,000	0
" 18	300	15,700
" 20	0	9,600
" 23	No specimen	1,800
" 25	No specimen	150
" 27	No specimen	25

terest in view of the recurrent and more or less evenly spaced outbreaks of poisoning.

These 2 cows were examined by a veterinarian who stated that they had "Garget" or mastitis which is a chronic infectious disease characterized by recurrent acute attacks when the cow is drying off, when she freshens, when she is fed heavily on a high protein diet, or when she is otherwise exposed to unusual strain. If the disease is acutely active, the milk may be changed in appearance. The milk from both of these cows was at times ropy and stringy, containing red blood cells and numerous

pus cells. From cow No. 7, the milk on two occasions showed the presence of macroscopic blood.

The school dairy consisted of 13 cows, tuberculin tested annually and apparently in good physical condition. The dairy barn is of reasonably modern construction, with individual stalls for the cows, cement floor, and ample water supply.

The milking is done by hand, by 5 boys who are students at the school. Generally speaking, sanitary precautions concerning the milkers, the cows, and the milk utensils could be regarded as satisfactory.

Each milker used an ordinary 1 gallon milk pail from which the milk was transferred, at the dairy barn, directly into 5 or 10 gallon cream cans. In this transfer the milk was strained through clean cheesecloth.

With the exception of that which went to the residences of the school principal and farm-manager, all the milk was carried from the barn to the kitchen (in the girl's dormitory) in these large cream cans, and stored in these containers until it was served. The kitchen contained two refrigerators, one an ordinary commercial Frigidaire and the other a built-in cold storage room, both being refrigerated by means of one electrical motor located in the basement of the kitchen. The cold-storage room was used largely for the storage of meat and these large containers of milk. The temperature in this room was considerably higher than that in the commercial Frigidaire.

The milk which was brought in at night was stored over night and served the following morning. The morning's milk was usually served at the evening meal.

The milk which went to the residences of the school principal and farm-manager was carried directly from the dairy barn to the residences in the small milk pails, transferred to milk con-

tainers and immediately placed in the refrigerators in the respective residences. Because of the much smaller milk containers and the lower temperatures in the refrigerators, the milk for the families of the school principal and farm manager became chilled very much more quickly and was brought to a lower temperature than that stored in the large cream cans and served to the rest of the resident population. This rapid chilling presumably inhibited the growth and toxin-production of the staphylococci present in the secreted milk, and therefore offers the most plausible explanation of the fact that no case of poisoning occurred in any member of these two households, notwithstanding the use of milk from the same cows that supplied the rest of the faculty and student body.

Recommendations to the school authorities embodied removal of 2 of the cows from the herd, and measures directed toward improvement of re-

frigeration facilities. These recommendations were put into effect immediately, and no additional cases of poisoning have been reported to date.

DISCUSSION

We believe that this is the first recorded outbreak of poisoning due to enterotoxic products of the staphylococcus where it was possible both to identify the enterotoxic substance, and to determine the source of the staphylococcus.

The circumstances under which the outbreak occurred merely add to already overwhelming evidence supporting the need for rigid sanitary control of milk supplies.

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Maternity Benefits in Cuba

A DECREE signed by the President of Cuba on April 18, 1934, prohibits the employment of women for 6 weeks following confinement. The prohibition applies to all establishments, whether industrial or commercial, public or private.

According to this decree a pregnant woman is permitted to leave her employment 6 weeks before the probable date of childbirth, upon presentation of a physician's certificate. For the duration of her absence from work the woman is to receive a cash benefit equal to her wages, paid from an insurance fund to which the State, the employers, and the women workers will be required to contribute. Attendance by a physician or midwife will also be provided.

An employer must permit every nursing mother to have two daily periods of half an hour each in which to nurse her child, exclusive of the rest periods provided by law.

Pregnancy or illness connected with it must not constitute a cause of discharge, unless the woman's absence exceeds the time allowed for that purpose.

No pregnant woman may be employed on strenuous work or on work that may interfere with the normal development of the child.

Every industrial or commercial establishment employing 50 or more women must provide a day nursery for employees' children under the age of 2.

Fines are provided for violations.—*Gaceta Oficial de la Republica de Cuba*, April 20, 1934.

Health Hazards in the Oil Industry*

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OIL is the miracle worker of our modern world, satisfying man's needs, not only in meeting demands of commerce and recreation, but furnishing heat, light, power, transportation, lubrication, cleaning, insect extermination, and medicines—a field, our chemists tell us, the surface of which has been only scratched. What a challenge to them!

The industrial hygienist receives the same challenge, for the possibilities of health hazards are many in the oil industry with its numerous and diversified processes. The literature on this subject reveals a wonderful lack of actual hazards; but the potential possibilities remain, nevertheless, when an analysis of the individual and varied operations is made.

Four major divisions of the oil industry combine to bring the oil and its various products to the public.

1. *Production* with its geological, drilling and pumping operations

2. *Transportation* with its pipe lines, pump stations, ships with their terminal facilities, automobiles with their garages and shops, and railroad tank cars

3. *Refining* with its stills, natural gasoline, grease, and other plants, tank farms, test and research laboratories

4. *Marketing* with its storage tanks, warehouses, and service stations

There are the usual service divisions necessary for the conduct of business on

a big scale. However, the employees in these divisions are office or shop workers primarily, and are not subjected to the health hazards characteristic of the major divisions, which are our chief concern.

There is one hazard common to all the major divisions, namely, gas vapors and fumes which are given off by the oil and its products. The effect of these is not so much incipient and cumulative, as it is sudden, due to the nature of the poisons in the gases and vapors.

First, we have the higher hydrocarbons—methane, ethane, propane, the butanes and, to a lesser extent, the lower hydrocarbons. The higher group, under certain conditions, are harmful to health. Some act as asphyxiants, others as irritants, and even in small quantities are poisonous. Those of the lower group may be similar in their action, but do not directly affect the body tissues or the delicate structure of the lungs; and produce no evidence of anything suggesting chronic poisoning, even when inhaled in considerable quantities day after day. Possibly the reason for this is that these lower gases are chemically inert and lacking in tendency to promote organic decay.

These hydrocarbons are found more in natural gas and refinery gas than in crude petroleum. Their composition is related to the temperature, consequently appreciable quantities cannot be present until the temperature is near the boiling point. An atmosphere containing more than 0.2 per cent of hydro-

* Read before the Industrial Hygiene Section of the American Public Health Association at the Sixty-third Annual Meeting in Pasadena, Calif., September 4, 1934.

carbon gas or vapor may be considered as dangerous.

We may have hydrogen sulphide in petroleum or its products, and here is a real health hazard, for its poisonous effects are well known, even when the air contains only 0.0003 per cent. Fortunately, this gas is encountered in but few of the oil districts. The proportion is ordinarily under 1 per cent, but as high as 15 per cent has been found. The light oils in Mexico have the highest percentage. Those in Ohio and the mid-continent fields have considerably less, while scarcely any is found in the oils in California.

Carbon dioxide, of course, is here, there, and anywhere, because it is the chief product of complete combustion. It is found, primarily, at all wells in flue gas, and in wash gas from furnaces and engines. This gas is not considered as containing poison which is deleterious to health but it will surely put one out if he gets enough of it, and not infrequently, the recipients remain sick for days.

Unlike carbon dioxide, carbon monoxide is one of the most insidious of the poisonous gases encountered in the oil industry. It is produced in the burning of carbon containing materials such as natural gas, coal, coke, wood, or gasoline, whenever the supply of air is not sufficient for complete combustion. Due to the outdoor nature of the oil industry and proper disposal of the waste from the furnaces and engines, concentrations of this gas are not likely to occur. Automobiles on the move and garages present the most serious hazards, but so much has been written about carbon monoxide in relation to the automobile, it is not necessary to review the subject here. I refer you to the *Travelers Standard* (Vol. XXII, Mar. 3, 1934).

Sulphur dioxide is a product of combustion when sulphur or any fuel containing sulphur or sulphides is burned,

and is the chief irritant present in flue gases when natural gas or any gas containing hydrogen sulphide is used as a fuel. It is also formed when coal is burned, and when lubricating oils are treated with sulphuric acid. It is used as a treating agent for the purification of gasoline, naphtha, kerosene, and lubricating oils, so is primarily used in refineries. It is handled in cylinders, as it is poisonous if over 0.004 per cent, but it is so irritating to the eyes and lungs in small concentrations that a person coming in contact with some of the escaped gas will get out of it before he experiences any poisonous effects.

From a detailed review of the chemistry of these gases, which is not permissible in so short a paper, it must be concluded that the hazard is primarily that of irritation and asphyxiation even with the more poisonous ones. Whether there is any detrimental cumulative effect on normal or pathological body tissues, or an aggravation of an existing condition from the inhalation of these gases in small quantities over a period of time, is a question to which there is no satisfactory answer. The literature is almost nil—expressions vague—which indicate that little research has been done.

As the compensation laws in the various states are changed to make industry responsible for industrial injuries, including the aggravation of existing physical conditions, as they are in California, the answer will be forthcoming. In this connection, let me cite a case under my personal observation of an employee who had worked 8 years as a mechanic. His duties required him to repair pumps in the pipe line stations. In working on the opened pumps he would be more or less exposed to the oil with its fumes and vapors. He developed a chronic nephritis, and after he died, his family brought claim under

the Workmen's Compensation Act for the total amount of the death disability, which under the California Law is payable if death results from the aggravation of an existing condition. Also, under the law, an employee only has to state he is injured, and the company pays unless it can prove he is not. I had a pump opened in order to reproduce the conditions under which he worked; had the gases and vapors analyzed; the amounts of the various gases in the air measured as to volume at various levels from the floor to the ceiling; made diagrams of the station showing method of ventilation, and air space; secured copies of our instructions to employees as to what to do when working in gases and vapors; had fellow workers in his crew ready to testify that claimant knew the instructions and observed them. I then sought the opinions of medical specialists, some of them with much experience in the oil industry, as to whether or not these conditions as stated could produce or aggravate a nephritis or any other kind of an "itis" in the human body. The consensus of opinion was that the gases and vapors were only irritating and anesthetic in action, and would not aggravate existing physical conditions.

At the trial, the claimant's attorney introduced evidence to show that the company had exposed his client to petroleum fumes and vapors, and then introduced exhibit "A"—a pamphlet issued by the U. S. Public Health Service, which dealt with the subject of Poisonous Effects of Benzol in Petroleum on the Human Body. He stated that the Service was the highest authority and most expert on such subjects, and rested his case. It was a simple matter to put our chemist on the stand, who testified there was no benzol in the petroleum or its gases passing through our pipe lines, although it was found in some oils outside of California. No evidence of poisoning

by other elements was introduced, so nothing was proved or disproved.

In considering the petroleum vapors and gases as a health hazard, let us not overlook the menace due to their explosive characteristics.

Another hazard common to all the major divisions is the production of skin rashes, blebs or pustules from direct contact with the oil or its products. This affects employees in varying degrees—some not at all, while others cannot be allowed to work in contact with the oil, and especially the distillates.

Let us now consider separately the hazards incident to each major division:

PRODUCTION

If you stand on the floor of an oil rig while drilling is in operation, you are impressed with the possibilities of the accident hazards. But what about the health? Well, the men seem healthy for they are out in the open, but they are out through wind or rain, heat or cold, day or night, and, theoretically, such exposure is certainly not conducive to good health.

We know noise is detrimental to the sense of hearing is fatiguing, is depressing to the nervous system. At times, gas escapes from a well for hours, and the men have to work in this roaring sound even though they can keep clear of the gas fumes, and this may have a decided and often a prolonged effect on hearing, in some cases.

The repeated removal of foreign bodies from eyes is detrimental to sight, but frequent washing of the drill pipe and greasing of the cables has minimized this hazard.

The pumpers, or those employees who service the wells after they are on production, are, I believe, quite free from health hazards except those due to natural elements. Regulation of health habits cannot be maintained due to the shift work. This is also true of most of the workers in the major divisions.

TRANSPORTATION

In this department, the main hazard is exposure to the fumes and vapors. Storage tanks, reservoirs, railroad tank cars, holds of oil tankers, pipe lines and their pumps have to be cleaned. Opening them up to fresh air, washing them down, steaming them out—experience has taught us—is not enough. This is usually done by opening a small man-hole in the top, over which the gauger stands and may inhale fumes. The full tank is not the dangerous one—but beware of the partly filled tank. There is room for the accumulation of plenty of gas. Leaking valves or cracks in the casings are sources of exposure usually unknown and unseen. An additional hazard in this department is dust from filings and scaling resulting from cleaning the pipes and tanks.

REFINING

Add to the gases and vapors already described, ammonia and chlorine. Then we have a list of the gases and vapors with which refinery workers may come in contact. What has been said about the danger of them can also be said about ammonia and chlorine—namely—they are primarily accident hazards, and not health hazards as we know them, but ammonia will produce a chronic catarrh if inhaled with air in a proportion over 0.15 per cent. Keep these gases and vapors in their containers by preventing leaks, and by proper vents in the pipes, stills, tanks, and ovens; and by the wearing of properly selected gas masks when the employees do encounter them, and you will have safe and healthy refinery workers.

However, there are other materials used which may prove to be a health hazard. I refer to sand, lead, paraffin, tar, acids, and alkalis. Sand is used in cleaning, as sand blasting; although I believe this method is being increasingly discontinued. The effect produced by inhaling sand particles is known as

silicosis, which is a subject in itself. The method of its use and control is well described in a pamphlet, *Safeguarding Sand Blasting Operations*, issued by the Standard Oil Company of New Jersey under date of February 9, 1934.

Recently, lead which is well known as a health hazard has been introduced into the industry in the form of tetra-ethyl lead. It proved to be a real hazard, and in the beginning caused several deaths in the manufacture and blending process. This cannot be charged to the oil industry, however, as the manufacturing is done by a special corporation. The finished product is received at the refineries in tanks, and under supervision of the Ethyl Gasoline Corporation is mixed into the gasoline by specially selected workers. The process is so automatic that the amount of vapor to which an employee is exposed is negligible. However, every precaution is taken by the employee as instructed by the Ethyl Corporation.

Crude oil and all the distillates may be contacted by the refinery worker. These products affect the skin to a greater or less degree. Usually a simple irritation is first produced, or there may be furuncles, papillomata, plaques, and even skin cancers are reported. The lower distillates, paraffin and tar, are the greatest offenders in producing real skin lesions; while the higher ones give rise to skin dryness, cracking, and simple dermatitis.

We cannot leave the refinery without mentioning that acids and alkalis are used in the preparation of petroleum products, but these are not volatile, and so no real health hazard; but do cause many burns, so again we have the accident hazard.

MARKETING

Lead chloride, bromide, and sulphate result in the form of dust from com-

bustion of ethyl gasoline. Does this produce a health hazard to the drivers of cars, to garage men, and mechanics working in cars using ethyl gas, and to the public? Extensive researches have been carried out by the Kettering Laboratory of Applied Physiology, and the results of their experiments are described in their pamphlet, *An Appraisal of the Lead Hazards Associated with the Distribution and Use of Gasoline Containing Tetraethyl Lead*. These results lead one to the conclusion that this hazard is negligible to garage attendants and mechanics; so practically nil to service station attendants and the public.

The only other hazard I have observed in the marketing division is irritation of the eyes of service station attendants which is caused by acids used in cleaning the springs of cars, and the use of trisodium phosphate for cleaning about the stations, especially the lubricating racks.

Health problems which are common to all employees in the oil industry, as well as to employees of other industries, deserve special consideration, although time will not permit of a full discussion. However, I want to mention 3—the common cold, vision, and syphilis.

A few years ago I offered our employees free inoculation with the Mixed Respiratory Vaccine. About 1,000 of the 6,000 employees have taken it, all of whom stated they were subject to colds. Of that number, 75 per cent report that they have had no colds since; 12 per cent that their colds have been fewer and less severe; and 13 per cent report no benefit. In reviewing my physical examinations of the no-benefit group, I discovered that nearly all of them were suffering from some form of chronic infection, such as sinusitis, rhinitis, pharyngitis or bronchitis. The conclusion, therefore, as to the real value of the vaccine is obvious.

For years I have been impressed by

the great amount of relief obtained from physical symptoms by proper treatment of the eyes. Early in my medical program I had an eye survey of the employees made by a doctor specializing in sight conservation and industrial illumination. He reported:

	Per cent
Normal vision	70
Subnormal vision	30
Pathological eyes	7
Recommended for vocational placement	2
Wearing glasses	22
Wearing glasses properly fitted..	42
Wearing glasses improperly fitted	58

Again the conclusion as to the real value is obvious.

Three years ago I included a Wassermann test as part of the physical examination, and 3.4 per cent of the employees gave a positive reaction. Of the number positive, 32 per cent admitted knowledge of infection, and 68 per cent denied any knowledge of infection. From my talks with the ones denying any knowledge of infection, I believe they were, with possibly 2 exceptions, sincere in their belief. From what we are told this is indeed a low per cent of positives, but it does mean that 2 per cent of the oil workers have syphilis who do not know it.

To tell a wage earner in these times of small wage income that he needs treatments for syphilis is creating a mental hazard unless treatments are offered at not more than the cost of medicine and materials used. Furthermore, the majority of cases are past 40 years of age, married, and have families. Thus, social as well as mental and financial problems are created. Only 4 per cent of my cases refused to take treatment, and among those treated, the reduction of the positive Wassermann findings has been indeed discouraging; so I present you the problem. What are we going to do about finding and treating the employee infected with syphilis?

Conclusions to be drawn from this paper certainly are that health hazards in the petroleum industry are few and are easy to control. The more important hazards are due to the natural elements, and the method of working the employees. Chemical poisons are pres-

ent in the form of gases and vapors, but they are more of an accident hazard than a health hazard.

Health problems outside of health hazards give the physician working in the oil industry a larger field of activity.

Simon Baruch Laboratory at Saratoga Springs

A NOTABLE company of physicians and men and women in public life gathered at Saratoga Springs, N. Y., on September 14 to witness the laying of the corner stone of the new Research Laboratory of the Saratoga Spa. Governor Herbert H. Lehman, who presided at the ceremonies, gave the laboratory the name of Dr. Simon Baruch, a pioneer in hydrotherapy in this country and professor of hydrotherapy at the College of Physicians and Surgeons for many years. The Saratoga cardiac therapy was based upon studies of European spas and long clinical experiment by Dr. Baruch. Dr. Herman B. Baruch, his son, laid the stone.

Dr. John Wyckoff, Dean of New York University-Bellevue Medical College, was the orator of the day. He stressed "the purpose and the value of an establishment such as is being developed here in Saratoga, in its relation to chronic illness."

Completed and equipped, the Simon Baruch Research Laboratory will represent an investment of \$750,000.

The Baruch Laboratory will be ready for use in 1935. It is one of the monumental group of buildings, all in process of construction, now going up at the Spa and which will, together, cost in excess of \$5,000,000. These buildings include the Hall of Springs, whose corner stone was laid in July, 1933; a new bath house of distinctive design and purpose, a hotel with sanitarium facilities, a new plant for the bottling of Geyser, Hathorn, and Coesa waters, and a recreation center, at which the remedial uses of sports will be stressed.

Pierrepont B. Noyes, of Oneida, N. Y., is chairman of the Saratoga Springs Commission. Its medical members are Dr. Carl R. Comstock, of Saratoga Springs, and Dr. L. Whittington Gorham, of Albany.

Public Health Aspects of Dried Foods*

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WHETHER drying or cold storage is the older method of food preservation used by man is a matter of speculation. Certainly both methods must have been practised in prehistoric times, and antedate any of the other methods now employed. The methods are also similar in fact that in modern times their use has been extended to new products through the use of new principles and new equipment. From the point of view of continuity of employment and essential stability of method, drying must be regarded as an eminently useful art in the advancement of human society.

Broadly speaking, we may consider drying as applicable to all classes of foods, including grains and spices. Usually we do not include the grains which ordinarily dry spontaneously without requiring special control of the process, nor do we include spices which, though often preserved by drying, have little direct nutritive value and may often be used to assist in the preservation of other foods. Between these extremes of usefulness all the other essential foods may be and are extensively preserved by controlled processes of drying. The list includes fish, meat, milk, eggs, fruits, and vegetables.

In view of its wide application, the public health significance of drying is naturally of interest. While dried foods

appear not to have been as widely investigated as have canned or fresh, numerous bacteriological studies have been made. The relatively few studies that have been made upon dried fish and meat, and the larger number on dried milk have been ably summarized by Tanner.¹ It should be noted that the drying of fish and meat is, as a method of preservation, usually augmented, if not eclipsed, by the use of the preservatives, salt or smoke. It should also be noted that salt and some of the components of smoke are admittedly toxic by themselves or when consumed in sufficient amount, but when used in the customary manner are regarded as entirely innocuous and even desirable by consumers and health authorities. A preservative is also used in the drying of fruits and this introduces considerations that will be discussed in some detail. In the drying of milk, eggs, and vegetables on the other hand, chemical preservatives are not used. *

Comparatively little bacteriological study has been made of dried fruits and vegetables. Most of this has been done by Prescott^{2, 3, 4, 5} and his coworkers, and by Fellers.⁶ As a rule only small numbers of organisms have been found when the products were in good condition, and these were of harmless types. A tendency for the organisms to die off on prolonged storage has been observed. While but little work has been done on the survival of pathogenic bacteria the indications are that danger in this respect is remote.

* Read before the Food and Nutrition Section of the American Public Health Association at the Sixty-third Annual Meeting at Pasadena, Calif., September 6, 1934.

It is presumable that the drying process itself as well as the treatments that often precede or follow it tend to kill microorganisms. A brief description of the drying methods for fruits and vegetables, together with reference to investigations made, may justify this statement. Of the comparatively small quantities of vegetables now being dried in the United States, all are dehydrated for periods of 6 hours or more, and the products are usually exposed for 1 hour or longer to temperatures of 150° F. or above.

The best dehydrated vegetables are steamed for 1 to 3 minutes before dehydration, though some are dried raw; none are sulphured. Among fruits only seedless raisins are customarily sun dried without some treatment with steam, hot water, or sulphur dioxide before or after drying. A few raisins are dipped in boiling lye solution before drying, and a few are both lye dipped and sulphured, followed by sun drying or dehydration. While seeded raisins are sun dried without pretreatment, the seeding process involves first dehydration, then treatment with boiling water or steam. Some figs are sulphured before sun drying, most are dried in the natural condition, but all types are ordinarily processed in boiling water for 1 to 4 minutes just before packing. Apples are sulphured and evaporated at temperatures usually exceeding 150° F.; many are later moistened and resulphured when packed. Prunes are dipped in boiling lye for a few seconds before sun drying or dehydration. When packed they are processed in boiling water for 2 to 5 minutes. Apricots, peaches, and pears are sulphured, then sun dried, and they are washed and resulphured when packed. Only the "natural" seedless and cluster raisins are packed without undergoing some more or less bactericidal treatment.

Of course there is no reason to sup-

pose that any of the treatments given to fruits and vegetables before, during, or after drying result in complete sterilization of the products. However, the general knowledge of time-temperature relations in the killing of microorganisms indicates that considerable reduction of the number of viable organisms may be expected from a few seconds' dip in boiling lye solution, a few minutes of exposure to boiling water or steam, a few hours in air at 140 to 160° F., or a few days of exposure to direct sunlight and temperatures of 120° F. or above.

The exact conditions employed by Fellers⁶ in pasteurization experiments are not met in the usual drying and packing processes, but the total counts observed by him in commercially packed American dried fruits compare favorably with the number of organisms found on pasteurized dates and figs. The writer has observed⁷ spoiling of unprocessed prunes at moisture contents as low as 18 per cent by yeast-like (as yet unidentified) organisms, while processed prunes did not spoil at moisture contents less than 22.5 per cent; all samples were held in sealed glass jars except when portions for chemical examination were removed. One explanation for this is thought to be that fewer viable organisms remained on the processed fruit, although this was not determined. As evidence of the bactericidal effect of sulphites, Cruess and Berg⁸ have found that 1,500 p.p.m. as SO₂ prevented fermentation of grape must for 2 years; this concentration is below that in many sulphured dried fruits. Also repeated attempts to isolate from adequately sulphured dried fruits microorganisms which had evidently been active before sulphuring have been unsuccessful at this laboratory. On the other hand molds growing on dried apricots containing SO₂ to the extent of 315 p.p.m. have been subcultured without difficulty. Molds have

been observed growing on dried pears containing 700 p.p.m. SO_2 . The last 2 cases represent instances of failure to give adequate sulphuring, which will be discussed below.

From the point of view of sanitation, it is unfortunate that in the United States fruits are not dried by dehydration as commonly as are vegetables. Because of the higher temperature employed and the reduced opportunity for contamination, dehydration is to be preferred to sun drying. Among fruits, however, only apples are generally dehydrated or evaporated. About 30 per cent of the prune crop of the country is dehydrated, about 7 per cent of the raisins, and only a negligible portion of the other fruits. A trade preference for sun dried apricots, figs, peaches, and pears exists, and the cost of sun drying these fruits is lower. For sun dried fruits the practice of processing by hot water or washing and resulphuring is desirable not only for cleanliness and improving the appearance of the products, but also for sanitary considerations.

The composition of fruits and the manner in which dried vegetables and most dried fruits are prepared for consumption are additional safeguards. The high acid and low protein content of fruits renders them unfavorable for the growth of most pathogens or the elaboration of toxins. Most dried fruits are cooked before they are eaten; dates, figs, and some raisins and prunes are exceptions. Of these, figs and prunes, as noted above, are processed in boiling water at the time of packing. The texture and flavor of dried vegetables render them unsuitable for use without cooking.

Dried fish and meat are for the most part cooked for consumption; when not cooked the preservatives used offer some protection. Dried eggs are practically always cooked. Dried milk is not always cooked and, since no preservative

is used in drying, the need for using safe milk in drying is apparent.

Dried fruits and vegetables are sometimes fumigated once or more to prevent development of insect infestation. Formerly hydrocyanic acid gas was used for the purpose, but at present this fumigant has been largely displaced by less toxic agents. According to the report of Williams⁹ the possibility of poisoning from fumigated dried foods, even when HCN is used, appears to be negligible.

On the whole, the public health record of dried foods is remarkably clear. The almost complete absence of food poisoning or infection cases in which dried foods have been involved indicates that they are among the safest forms of food. In an outbreak attributed to pudding made from dried peas¹⁰ there is evidence that contamination of the food took place after it was cooked. Two cases of poisoning from codfish cakes were investigated¹¹ and the causative organism identified, but the channel of infection was not traced; it seems possible if not probable that the contamination here also took place after cooking. An outbreak of colitis was traced to repacked dates¹²; here the culpability of the dried product seems established. Fifty-two cases of botulism have been reported from Russia¹³ of which about half were attributed to salted, dried, or smoked herring, salmon, or sturgeon eaten without cooking.

If this is a fair summary of the case against dried foods, considering the international nature of trade in dried fruits and the unsanitary methods sometimes used, they do not appear to be a serious health hazard. In this country the increasing use of machine-filled small containers and pasteurization offer increased protection to the public.

It is not claimed that the possibilities of infection or intoxication from dried foods in general have been covered in

this discussion. As a matter of fact, the chief interest and almost the whole experience of the writer has been in the problems that surround the drying of fruits and vegetables. In view of the failure of dehydrated vegetables to fulfill the promise of commercial development held forth by the stimulation if not creation of this industry during the World War, it may be well to dismiss dried vegetables also with the few remarks that have already been made.

There is a matter involved in the drying of fruits that seems to merit more extensive treatment than has usually been accorded it. There has been considerable discussion of it based upon prejudice or presumption, but the facts appear to have had more of avoidance than treatment. The point in question is the use of sulphur dioxide or sulphites in the drying of certain fruits, chiefly apples, apricots, peaches, and pears.

Sulphur dioxide is a chemical preservative. If it is to be used it must meet certain conditions from the standpoint of regulatory requirements. As used it must not endanger the health of the consumer, it must not be used for the purpose of concealing inferiority of the product, and it seems fair also to require that it be not used in amounts beyond those necessary to accomplish the purpose at hand.

The investigations of Rost and Franz¹⁴ and perhaps those of Wiley¹⁵ indicate that the ingestion of sulphites or sulphurous acid alone or in sufficient quantity produces toxic effects. On the other hand, the unpublished investigations carried out at the instigation of the U. S. Bureau of Chemistry between 1909 and 1914, and the more recent work in Germany reported by Flury,¹⁶ indicate that when consumed as a constituent of dried fruits, even in abnormally large amounts the preservative is without harmful effects. Flury compares the effects of sulphites to those of acetic acid, and points out that the

presence of sugar or pectinous materials with which the sulphites may be combined in the food appears to protect the body against harmful effects. The American Medical Association in an official publication¹⁷ has recently declared sulphites in dried fruits to be entirely harmless. As Flury points out, the constant use of sulphured fruits for years by the public and in hospitals and other institutions with close medical supervision has been attended by no discernible ill effects.

As to the second requirement it can be said that sulphur dioxide neither is, nor can be, used to conceal inferiority of dried fruits, if by that is meant the presence of decomposition or decay. It is true that high sulphur dioxide content will permit dried fruits to be held without spoilage at higher moisture contents than is possible without it. Existing tolerances set up by the U. S. Food and Drug Administration for moisture content in dried apples, apricots, and peaches appear to provide adequate protection against such an abuse, if it exists.

Approach to the third phase of the regulatory problem of the permissibility of sulphur dioxide may be made by asking the purpose of using this preservative and the amount required. The primary purpose is to preserve as far as possible the natural color of the fruit. The quantity required cannot be stated so simply, for it depends upon the degree to which the color needs to be preserved and is associated with other essential characteristics of the fruit, as well as upon the time for which the conditions under which the color is to be preserved. The work of Chace, Church, and Sorber,¹⁸ of Nichols and Christie,¹⁹ and many unpublished observations of the writer indicate that the best obtainable retention of color in California dried apricots is not consistently attained if the sulphur dioxide content is below 1,000 p.p.m.; commonly 2,000

or more are necessary and in some districts as much as 3,000 p.p.m. The usual method of sulphuring in California is to expose the cut fruit on trays to the fumes of burning sulphur in more or less tight sulphur houses. When this method is used, the amount of SO_2 absorbed by the fruit is not readily controllable within about 500 p.p.m. Nichols and Christie¹⁹ have shown that dried peaches and apricots lose half or more of their sulphur dioxide content when held in common storage for 6 months. It is also known that half or more of the sulphur dioxide disappears during cooking of the fruit. Nichols and Reed²⁰ in experiments with dried fruits originally of excellent color have shown that on storage the color of dried apples deteriorated so greatly that the fruit was regarded as unmerchantable when the sulphur dioxide content fell to about 200 p.p.m. A similar change took place in apricots and in pears at about 500 p.p.m. Therefore to provide for variations in season and district and for a factor of safety in case of prolonged storage, amounts of sulphur dioxide between 2,000 and 3,000 p.p.m. certainly do not appear beyond the range of necessity for apricots, peaches, and pears. Apples do not readily absorb these amounts, and require less for satisfactory retention of color.

In addition to its effect on color retention, its action on some of the vitamins is also pertinent. Morgan and Field^{21, 22} and Morgan, Field and Nichols^{23, 24, 25} have observed in the dried fruits they have studied that sulphur dioxide has a destructive effect on vitamin B (B_1), does not affect G, notably improves the retention of A, and appears to be essential if any C is to be retained. The preservative protects C through cooking as well as drying and storage. The fruits that are regularly sulphured were found to be relatively poor sources of B but are among the richest sources of A and C.

The minimum amount of sulphur dioxide necessary to preserve C was found to be about 500 p.p.m. This is of interest in reference to the observations of Nichols and Reed as to color deterioration, and to those of Joslyn, Marsh, and Morgan,²⁶ who found a simultaneous loss of vitamin C and darkening of color in orange juice.

In press reports²⁷ relating to the work of Balls and Hale of the Bureau of Chemistry and Soils, Washington, D. C., pineapple juice, cysteine, and glutathione have recently been suggested as substitutes for sulphur dioxide in fruit drying. Since these reports were made time has not permitted a careful study of the possibility of using these substitutes in the drying of apricots, peaches, and pears, which apparently had not been tried. Preliminary trials observed by the writer have been rather disappointing and it appears doubtful whether the substitutes will prove adequate.

Until such time as adequate substitutes be found it may well be asked whether the existing regulations pertaining to sulphur dioxide should not be revised. In various foreign countries the tolerances for sulphur dioxide in dried fruits range from 0 to 2,500 p.p.m. Some countries set no limit. In the United States the federal government has no defined limit, but several states have restrictive tolerances or permit none. The maintenance of some of the existing tolerances or the setting up of new restrictions that would not permit the retention of satisfactory color in cut dried fruits would appear to lead toward exclusion of these foods from the diet. In view of their excellent nutritive values, their low relative cost, the seemingly well established harmlessness of the preservative, and the protection it affords against infective agents and vitamin losses, it would seem that uniform and liberal regulations regarding its use would be desirable.

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The American Red Cross

Roll Call from Armistice Day to Thanksgiving



Practical Application of School Health Principles*

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THE School Health Research of the American Child Health Association has developed certain principles of procedure as conducive to more efficiency in school health programs. These principles have been thoroughly discussed in the Fifth Monograph of the School Health Research Series¹ and in the New York City study, *Physical Defects—The Pathway to Correction*² which was financed by the Metropolitan Life Insurance Company.

I have had an opportunity during the past year to experiment with the practical application of these principles in a school system that is fairly typical of many well managed schools. I was the only school physician and had the assistance of 1 nurse in a system of about 2,000 elementary school children and 1,500 junior and senior high school pupils. I shall discuss the way we applied some of these principles to the health program in our 5 elementary schools. While our efforts were divided with the demands for service and health education in the high school, our experience in the elementary schools offers the most direct application of the principles which came from the research.

We find in the monograph, *An Evaluation of School Health Procedures*,

that certain activities characterized as indicating team work between the nurse and teacher actually produced results. That is, in schools where there was a good nurse-teacher rapport, there we found the best results in the children. Obviously this is a sensible principle but research evidence of its importance leads us to extra efforts to apply it.

We have found in Freeport that nurse-teacher rapport can be developed if the nurse responds *thoroughly* to all requests of the teacher for advice, examinations, and follow-up of her children. When the teacher says she thinks Johnny may have some trouble with his eyes which handicaps him in his school work, an examination is made as promptly as possible, the report is made to the teacher, the observations of the teacher are noted for advising the parents, and the follow-up is consistently reported *back* to the teacher.

I am convinced a large part of the trouble with obtaining the teacher's interest is the failure to take seriously enough such observations as the teacher supposes are significant. Teachers too often feel that their observations have no significance to the nurse and physician, or that they are not sufficiently encouraged to propose further problems. Therefore, we consider almost no work has preference over a thorough investigation and follow-through of every problem proposed by teachers.

Considerable ground work along this

* Read before the Child Hygiene Section of the American Public Health Association at the Sixty-third Annual Meeting in Pasadena, Calif., September 3, 1934.

line had fortunately preceded me in Freeport. Miss Derrick, our school nurse, had been shrewd enough to recognize that she could accomplish little in follow-up without the fullest teacher coöperation. She had discovered that the annual accumulation of records of physical defects for follow-up were overwhelming if she attempted thorough follow-up upon all of them. The sick child who failed to obtain medical attention, the toothaches, the tonsillitis, acute cervical adenitis, and all the neglected cases referred by teachers were obviously children deserving precedence in her follow-up program. She served the teachers and the teachers responded to her efforts. She soon discovered that her interest in the teachers' questions resulted in further consultations by teachers and reference of more children with neglected health conditions. She realized that the numerous tonsil defects listed by the school physician were not all urgently in need of medical care, and not all could obtain treatment, so she focused her follow-up upon the more serious cases of medical neglect referred by the teachers. And yet there were plenty of tonsillectomies. We found this year that 50 per cent of the 5th and 6th grade children have their tonsils out. But her efforts for tonsillectomy were focused on the really serious cases with medical history indications of need for tonsillectomy.

During the past year we have extended this nurse-teacher rapport as well as a doctor-teacher rapport, not by any peculiar personality influence upon the teachers but merely by applying methods that any nurse can apply. We ask the teachers to observe selected children for eye symptoms. We ask for observations of mouth breathing, for a check up and report of which cases go to a dentist, and which cases obtain tonsillectomy, glasses, or other medical care.

These supposed burdens are put upon the teachers with no complaint from them that they have too much to do; nor do we find that the teacher is not interested. Our teachers are burdened with as heavy a load as those anywhere but they are also interested in doing what they can for the neglected child. A question of the teacher about an individual child's behavior in school or about his psychological reactions in study and play invariably arouses her interest as to the possibility that the removal of physical handicaps may accomplish what she would like to do for the child.

While the teacher is not uninterested, a long list of physical defect symbols after the names of her pupils is certain to leave her cold and uncoöperative. We avoid heaping up too many defect findings for the teacher to interest herself in by the manner of the examination.

We test (1) vision on one visit; (2) hearing on another; (3) teeth are examined at another; (4) when a classroom inspection is made for a check-up on skin and pediculosis or contagion, other conditions are noted for the teacher's observation and report; (5) the more obvious cases of malnutrition may be selected for special observation, or we may advise the teacher as to ways in which she can coöperate in the follow-up; (6) on another occasion the child may have his throat, glands, heart, and other parts examined.

These are screening devices, and I shall say more about the examination later; but I would emphasize that a few cases at a time thoroughly discussed with the teacher invariably arouses her interest and brings forth a willingness to observe, report, and otherwise assist in follow-up. Such discussions with the teacher provide ideal opportunities for instructing her in fundamental subject matter for health education.

We are convinced from our experience this year that the principle of rapport among all the school health personnel as presented in the School Health Study and the New York City Study is not only a valuable asset in obtaining the correction of physical defects but is absolutely essential if we are to make our advice to parents regarding the need for medical care reasonably effective. It is essential if the medical examiner is to consider the history and behavior of the child from one who has observed it. It is the only way that we can get the teacher to understand the needs of her pupils. Certainly an understanding by the teacher of the physical defects of her pupils is necessary if she is to build respect for medical attention and if education is to lead toward a wiser use of community medical resources. No doubt many cases of medical neglect result from a lack of understanding of child needs by parents. Not all parents of children in need of medical care can possibly be visited for effective education by the nurse, but with the teacher's help cases can be selected with discrimination so that personal conferences can be arranged whenever an explanation to the parent will be profitable. Continued follow-through is essential for successful follow-up and this can only be attained with the teacher's interest.

A second principle which came out of the school health research which was associated with good results in the children, was the need for a thorough and adequate examination of the children. This is expressed in the New York City report as, "There should be accurate detection of defect cases with economy of effort," and a corollary of this principle is "The home visit should be backed by authority." In other words, before we launch forth the nurse on the expensive and time consuming follow-up of home visits or indeed any conferences with parents, we

should be sure that the record of defect is truly a defect needing attention. The study in New York indicates clearly that the selection of cases for follow-up had not been made on any such accurate basis. Many cases were missed and many cases were wrongly selected for follow-up. I am confident from experience on numerous surveys and contacts with school health services that a similar degree of inaccuracy in the detection of defect cases prevails in most cities offering school medical and nursing service.

Better examinations have been recognized as desirable for a long time, but only recently has it been clear that it was not practical to supply thorough and adequate health examinations for every public school child every year. My experience in Freeport has given me confidence that such tests as were developed by the School Health Research of the American Child Health Association combined with rapid inspections by a physician can be used as screening devices to select a limited number of cases so that more time can be given to the cases most likely to be in need of attention.

We have used a modified Snellen test devised in the School Health Study for testing visual acuity with increased confidence in its practicability and accuracy as a screening device. It can be used by a technician without medical or nurse training. We ask the children about eye symptoms at the time of the testing; observation is made of blepharitis, inflammation of the conjunctiva and sclera, and cases showing any suspicion of symptoms or inflammation are recorded for observation. Cases for observation are listed for the teacher to observe before initiating follow-up. While not all such selections have sufficiently serious symptoms to justify follow-up, the listing of the cases and the resulting conference with the teacher is very effective in training

the teacher to observe her pupils for eye symptoms, and such teacher observations bring about the discovery of many cases with normal visual acuity who suffer eye strain.

A well trained technician selecting visual acuity cases of 20/40ths or worse can be depended upon to give authority for follow-up. However, before we make the home visit, a conference is held with the teacher for two reasons: (1) to enlist her assistance in a check-up as to whether the child gets an examination by his oculist or whether he goes to a clinic; (2) to get ammunition in order that the nurse may talk with the mother about her individual child. Symptoms observed by the teacher as well as knowledge of the child's progress in class work and behavior are always of interest to parents, and a definite account about a particular child makes the advice to seek medical care effective.

In the 4a Audiometer accompanied by the 2a Audiometer we have another screening device suitable for operation by a technician so that the physician can have time to give the kind of examinations that he is trained to give rather than the kind of march-by examinations so common in public school practice. The phonograph records for this instrument, however, should be improved for greater accuracy. There seems reason to expect that the Bell Telephone Laboratories with the help of the research of the School Health Study will make it possible for us to use this instrument so that we may rapidly and accurately select all hard of hearing pupils.

The New York City Study as well as the monograph, *Physical Measures of Growth and Nutrition*² has clearly demonstrated that physicians cannot make satisfactory selections of undernourished children under the single examination scheme of school examinations. No doubt extreme cases can be

selected, but such cases are on the average considerably less than 5 per cent. The 10, 15, and 20 per cent ordinarily selected are not proper selections and a better selection is necessary if we are to do anything with malnutrition among school children. The ACH index is a suitable preliminary screening device. But before we initiate follow-up, further measurements of the screened cases are needed to obtain the children underweight for 4 skeletal dimensions and also those with small sized musculature and small amounts of adipose tissue in proportion to their body build. By screening we are able to limit the number requiring thorough examinations so that we can use the complete physical measurements and a clinical history. Such examinations give confidence that we have selected the cases most likely to be in need of medical attention for malnutrition.

I have not been able to try out this plan thoroughly in Freeport because we were not prepared to give adequate follow-up for any large number beyond the possible underfed cases that were under severe economic stress due to unemployment. We have not yet succeeded in selling to our school authorities the idea that the employment of a technician is good economy. We were, therefore, limited in the number of cases that could be measured. We had the services of two CWA workers for several months for follow-up under a trained nutrition worker through the efforts of the County Medical Society. This assistance enabled us to check the food selected by the families on relief and to advise on the buying of food to improve diets in the most needy cases. The school children in these families were all measured and thoroughly examined so that special recommendations for supplementary food for the undernourished children were made to the Relief Authorities. This plan of handling unemployment malnutrition

has been consistent with the principle of "Accurate detection of defect cases with an economy of effort." The selection of the cases under economic stress as the cases for whom we could offer effective follow-up enabled us to provide complete measurement and examination with a clinical history before follow-up was initiated.

A symposium last June at the meeting of the American Academy of Pediatrics was unanimous in agreeing on the importance of the clinical history for deciding on the need of tonsillectomy. While as School Medical Adviser I never advise tonsillectomy, I do have a responsibility not to increase the number of unnecessary tonsil operations, and I cannot say that a child is in need of attention for tonsils without a clinical history except in the very few cases with obstruction or extreme infection.

To screen out the cases most likely to need attention we rely heavily on the teacher to obtain a history. Every absence from school requires an excuse. This year we asked the teachers to distinguish sickness absence from other absences on their reports. Next year they will report the kind of sickness suffered by the child. While accurate diagnosis of every absence case may not be attained, frequent absence due to sickness is a clue to initiate an investigation to confirm the character of the illness. Cases with recurrent sore throat, cervical adenitis, and rheumatic fever are selected for confirmation and then are recommended for tonsil attention.

If the case is likely to go readily to the family physician, we suggest to the parents that they seek their own physician's advice. A child from a family who cannot afford a physician gives us an even greater responsibility for selecting only the cases that can truly profit from medical care. This means in most cases selection of the cases needing tonsillectomy. The cost of follow-up

and the cost of medical care supplied by the welfare agencies demands that we select cases with real indications for tonsillectomy and not place this responsibility for selection entirely upon the physician employed by the relief authorities. In many cases this requires observation and reexamination and investigation of the history in the same way as the pediatrician does in his private office. With 50 per cent or more children being operated upon our concern should be for a wise selection of cases recommended for medical attention and not for more tonsillectomy.

Our screening procedure is, first attention to the cases referred by teachers, then to all cases with a tonsil history as shown by the sickness absence reports, and, finally, we search for suspicious cases by rapid throat inspections and refer these for observation and for report from the teacher—giving her specific advice as to what to be on the lookout for.

A third and one of the most important principles came from the New York City study. That is "The available correction facilities should be considered in determining the severity of a selection for follow-up." Of course there is no point in discovering defects year after year if we cannot do anything about them. Only the most intelligent parents respond to a form notice with no other follow-up. Such parents generally obtain sufficient medical care so that school advice is not often needed, except for vision defects. In order that the nurse may be thorough and not be swamped by an excess of cases both serious and not so serious, we consider her follow-up load in selecting the cases for her to follow up.

All follow-up is graded as to the seriousness of the need. This grading is the responsibility of the physician who makes the final decision for follow-up. Our nursing service is adequate for the worst cases and, as we

improve our teacher interest and improve the efficiency of our record keeping and check-up, we can follow up many more cases. We list our cases: first, as urgent, and second, as suitable for advising parents if and when we are able, and third, as suspicious cases for observation and follow-up when definite indications are confirmed as to the need for medical care. When the nurse clears up the urgent cases, she starts on those less urgent; and as we progress we intensify our search for other less apparent needs, working up the cases under observation. This of course requires close team work between the nurse and the physician. The nurse notifies the physician as she clears up the urgent and less urgent cases so that he may have time for a check-up on teacher observations, sickness absences, and such reexaminations as are necessary to discover other conditions deserving follow-up.

The small number of neglected defects from the more intelligent and well-to-do families generally require little time for follow-up because a tactful telephone conversation generally results in prompt reference to the private physician, and no limitations are met as to medical facilities. On the other hand, we are limited as to free service and we must know how many cases our clinics can handle each week if we are to care for our worst cases first.

In Freeport we very early reached our limit in the facilities of the community free dental clinic. We then arranged a system of appointments for extraction and sent the clinic only the worst abscessed teeth cases, and began our campaign for an increase in facili-

ties to meet the need for serious dental infections. I think we have about solved the problem of neglected abscessed teeth.

Likewise we have met a limit in the facilities for free refraction and glasses and must face next year the problem of caring for a larger number unless the unemployment situation improves greatly. A great deal of time and thought is required to keep clear the coordination of our facilities for medical relief with our efforts in finding the children in need of medical care, and with the follow-up load of the nurse.

I have not time for a discussion of live records that do not require a full-time book-keeper. We have made some progress but further experimentation is needed.

Other administrators may apply these principles using other methods, but I am confident no school health program can give reasonably adequate attention to the medically neglected children without an extravagantly large and expensive staff unless they develop nurse-teacher rapport, use screening devices for selecting children so that their physician may give adequate time to clinical considerations, and coordinate the examination findings with the follow-up and medical care facilities.

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Experience With Alum Precipitated Toxoid in Virginia and Observations on the Reaction Following Its Use *

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SINCE the introduction of alum precipitated toxoid, numerous workers have reported observations indicating that it is efficacious in the production of active immunity to diphtheria. Experience of most of these observers has shown that over 90 per cent immunity in originally Schick positive individuals may be expected following the use of a single dose of alum precipitated toxoid. A single dose of toxoid has the advantage of subjecting the patient to but a single unpleasant experience and saving time and expense, thus making the universal use of a diphtheria preventive more practical. Since the experience with alum precipitated toxoid is not yet very large, certain questions and possible objections to its use should be considered. First, does a single dose of commercial alum precipitated toxoid in routine use produce a high percentage of immunity to diphtheria? Second, is the immunity produced by alum precipitated toxoid (as measured by the Schick test) durable? Third, are the reactions following the use of alum precipitated toxoid of sufficient severity to limit its use?

Recently a study has been carried

on in Virginia in an attempt to answer these questions. In order to determine the efficacy of alum precipitated toxoid in the routine immunization of children, groups representing both urban and rural populations, white and colored races, and as wide as possible variations in diphtheria experience have been studied. Seventeen hundred and sixty-five Schick positive individuals were given one dose of 0.5 c.c. or 1 c.c. of alum precipitated toxoid of a potency of from 12.5 to 31.5 flocculating units per c.c., and retested 2 months later; 94.4 per cent of these were found to have been rendered Schick negative. A similar group of 347 were treated the same way but not retested until the end of the year; 95.1 per cent of these were Schick negative.

Table I shows the Schick reaction of these two groups of individuals by age groups and color. The difference between the negro and the white population is significant. This would indicate that artificial active immunization of the negro race against diphtheria is slightly more difficult than the immunization of the white race, a fact which we are unable to explain. There is no significant difference in the efficacy of alum precipitated toxoid in the various age groups nor is any sex variation noted. Four hundred and

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TABLE I

SCHICK REACTION OF ORIGINALLY SCHICK POSITIVE INDIVIDUALS AT THE END OF
2 MONTHS OR 1 YEAR FOLLOWING THE ADMINISTRATION OF
1 DOSE OF ALUM PRECIPITATED TOXOID

Age	After 2 Months				After 1 Year			
	Number Tested		Per cent Negative		Number Tested		Per cent Negative	
	White	Colored	White	Colored	White	Colored	White	Colored
0-4	15	3	100.0	100.0	10	5	100.0	100.0
5-9	507	383	95.9	93.0	146	43	96.6	83.7
10-14	446	317	96.9	91.2	76	29	96.1	93.1
15+	58	36	94.8	86.1	35	3	100.0	100.0
Total	1,026	739	96.3	91.9	267	80	97.0	88.8

eighteen of those included in the group re-tested at the end of 2 months had at some time been given some form of diphtheria immunizing treatment, while 1,347 gave no history of any previous immunizing treatment; but no significant difference can be shown in the efficacy of alum precipitated toxoid in these two groups. In brief, our experience is that no matter what the previous treatment, age, sex, or color of a group has been, 1 dose of alum precipitated toxoid renders over 90 per cent of them Schick negative for at least a year.

In order to compare the durability of the immunity produced by alum precipitated toxoid with naturally acquired immunity to diphtheria and with the immunity produced by other diphtheria immunizing agents, a group of 1,636 Schick negative individuals were re-tested at the end of one year. This group is made up of 550 Schick negative individuals who gave no history of previous immunization, 519 who gave a history of previous immunization, 225 originally Schick positive and rendered Schick negative at the end of 2 months by a high potency toxoid furnished by

TABLE II
REVERSION OF SCHICK NEGATIVES IN 1 YEAR

	Positive	Total	Per cent showing reversion
Originally Schick negative— With no history of previous immunization	36	550	6.5
Originally Schick negative— With history of previous immunization	24	519	4.6
Originally Schick positive— Rendered Schick negative by Park's toxoid	10	225	4.4
Originally Schick positive— Rendered Schick negative by alum precipitated toxoid	19	342	5.6
	89	1,636	5.4

Dr. W. H. Park, and 342 originally Schick positive rendered Schick negative at the end of 2 months by alum precipitated toxoid. Reliable information as to the immunizing agent given the 519 Schick negative individuals who gave a history of previous treatment was difficult to obtain but it is known that most of these received toxin-antitoxin.

Table II shows the reversion of these various groups of Schick negatives in one year. The differences in per cent showing reversion are not significant, indicating that the durability of immunity produced by alum precipitated toxoid is not less than that which is produced by natural causes or by other diphtheria immunizing agents.

The potency of the alum precipitated toxoid used in this study varied from 12.5 to 31.3 flocculating units per c.c. and the dosage of toxoid was either 0.5 c.c. or 1 c.c. Eight hundred and fifteen individuals, including both white and colored, were given 0.5 c.c. of a toxoid containing from 12.5 to 17.3 flocculating units per c.c., while 950 were given 1 c.c. of toxoid varying in potency from 12.5 to 31.3 flocculating units per c.c. Though the differences in the immunity produced by the two dosages are not significant, the percentage rendered Schick negative by the larger dose is consistently higher. While this study was being carried on,

we had the opportunity of observing with Dr. W. A. Browne of the Richmond City Health Department, a group of 250 originally Schick positive children who had received one dose of 1 c.c. of alum precipitated toxoid containing 3.5 flocculating units per c.c. Only 69 per cent of this group of originally Schick positive individuals were rendered Schick negative by this low potency toxoid. It seems, therefore, that the optimum potency of alum precipitated toxoid lies somewhere above this level.

As there has been considerable apprehension concerning the reactions following the administration of alum precipitated toxoid, an attempt has been made to determine the severity of reactions, both local and systemic, following its use. A group of 353 individuals mostly of preschool and school age, have been observed following the administration of alum precipitated toxoid. All were originally Schick positive and were given 1 c.c. of toxoid ranging in potency from 18.1 to 29.7 flocculating units per c.c. The temperature of each individual was taken before the administration of toxoid and again at the end of approximately 24 and 48 hours. The history of each individual was taken at the end of 24 and 48 hours and the local and systemic reactions observed and recorded, and

TABLE III

PER CENT OF INDIVIDUALS SHOWING CERTAIN SIGNS AND SYMPTOMS FOLLOWING THE ADMINISTRATION OF ALUM PRECIPITATED TOXOID

Age	Number Observed	Per cent showing reaction	Local Reaction Per cent Showing			Systemic Reaction Per cent Showing						
			Red Area	Soreness and Tenderness	Swelling	Malaise or Headache	Nausea	Vomiting	Increase in Temperature			
									10-1.9°	20-2.9°	30-3.9°	40-4.9°
0-9	203	67.5	41.4	17.2	7.4	10.3	3.4	3.0	25.6	7.9	2.0	1.5
10+	150	72.7	51.3	24.7	16.0	15.3	3.3	4.0	32.7	13.3	1.3	2.0
Total	353	69.7	45.6	20.4	11.0	12.5	3.4	3.4	28.6	10.2	1.7	1.7

all individuals having either local or systemic reactions were observed daily until all symptoms had subsided.

It will be noticed that 69.7 per cent showed some reaction either local, systemic, or both, and that the older ages consistently have a higher percentage showing each symptom indicating that their reaction is more marked. A local red area and an increase in temperature are the most common symptoms.

local reaction was considered to be one in which there was a large, red, indurated area with soreness, tenderness, swelling, and local heat. A mild systemic reaction was considered to be one in which there was from 1 to 2 degrees of temperature elevation with no other symptoms, or no temperature elevation with a single mild symptom. A moderate systemic reaction was considered to be one in which there was an elevation of temperature of more than

TABLE IV
OBSERVATION ON THE REACTION FOLLOWING THE
ADMINISTRATION OF 1 DOSE OF 1 C.C. ALUM PRECIPITATED TOXOID

Age	Number Observed	Per cent Showing			
		No Reaction	Local Reaction Only	Systemic Reaction Only	Local and Systemic Reactions
0- 9	203	32.5	23.2	19.2	25.1
10 +	150	27.3	20.7	14.7	37.3
Total	353	30.3	22.1	17.3	30.3

Table IV shows the relative frequency of local and systemic reactions. It is seen in this group that 30.3 per cent showed no reactions, either local or systemic; 22 per cent showed local reaction only; 17 per cent showed systemic reaction only; and 30 per cent showed a combination of local and systemic reactions.

An attempt was made to classify the severity of both local and systemic reactions into classes of mild, moderate, or severe. A mild local reaction was considered to be one in which there was a local red area less than 5 cm. in diameter, with or without slight soreness or tenderness but showing no other local symptoms. A moderate local reaction was considered to be one in which there was a local area of redness with definite soreness and tenderness with or without swelling. A severe

2 degrees and no other symptoms, or two symptoms with less than 2 degrees of temperature. A severe systemic reaction was considered to be one in which there was an elevation of temperature with headache or general malaise and nausea or vomiting.

Table V shows the correlation between the various degrees of local and systemic reactions. Fifteen per cent showed mild, local and systemic reactions, 4 per cent moderate and 0.3 per cent, or one individual, showed severe local and systemic reactions. Eighty-one per cent of the entire group fall into the classification having either no or mild local and systemic reactions and 19 per cent have moderate or severe local and systemic reactions.

Monroe and Volk¹ have reported a study of the reactions following the administration of untreated toxoid and

TABLE V
CORRELATION BETWEEN SYSTEMIC AND LOCAL REACTIONS
FOLLOWING 1 DOSE OF 1 C.C. OF ALUM PRECIPITATED TOXOID

Local Reactions	Systemic Reactions									
	None		Mild		Moderate		Severe		Total	
	No.	%	No.	%	No.	%	No.	%	No.	%
None	107	30.3	59	16.7	2	0.6	0	0.0	168	47.6
Mild	67	19.0	53	15.0	14	4.0	4	1.1	138	39.1
Moderate	10	2.8	17	4.8	14	4.0	4	1.1	45	12.7
Severe	0	0.0	1	0.3	0	0.0	1	0.3	2	0.6
Total	184	52.1	130	36.8	30	8.5	9	2.5	353	100.0

toxoid to which 0.2 per cent alum was added. In so far as our observations can be compared with theirs, there does not seem to be a marked difference in the reactions following alum precipitated toxoid and untreated toxoid.

In order to compare more clearly the reactions following the administration of alum precipitated toxoid and untreated toxoid, a parallel series of observations were made on 93 originally Schick positive individuals in which one individual was given 1 c.c. of alum precipitated toxoid and the next 1 c.c. of untreated toxoid. These two groups of individuals are entirely comparable in age and sex. The temperature was

taken on each individual before the injection of the toxoid and at the end of 24 and 48 hours afterward. Histories were taken and observations made daily until all symptoms subsided.

Table VI gives a comparison of the per cent of individuals showing certain signs and symptoms following the administration of untreated toxoid and alum precipitated toxoid. No significant difference in the two groups is seen in the per cent showing any reaction. The factors making up the local reactions run almost parallel for the two groups. The per cent showing malaise or headache is high in the group receiving untreated toxoid but the in-

TABLE VI
PER CENT OF INDIVIDUALS SHOWING CERTAIN SIGNS AND SYMPTOMS
FOLLOWING THE ADMINISTRATION OF UNTREATED TOXOID AND
ALUM PRECIPITATED TOXOID IN A PARALLEL SERIES

Toxoid Administered	Number Observed	Per cent showing reaction	Local Reaction Per cent Showing			Systemic Reaction Per cent Showing						
			Red Area	Soreness and Tenderness	Swelling	Malaise or Headache	Nausea	Vomiting	Increase in Temperature			
									1°-1.9°	2°-2.9°	3°-3.9°	4°-4.9°
Alum Precipitated	50	68.0	52.0	30.0	6.0	2.0	0.0	0.0	30.0	8.0	2.0	0.0
Untreated	43	67.4	39.5	27.9	9.3	14.0	2.3	0.0	27.9	2.3	2.3	0.0

definiteness of this symptom and the small number observed make this difference of little significance. The temperature elevations are almost parallel in the two groups.

ing alum precipitated toxoid are in any way different from the reactions following untreated toxoid.
More than 3,000 children were given a single dose of 0.5 c.c. or 1 c.c. of

TABLE VII
OBSERVATION ON THE REACTION FOLLOWING THE
ADMINISTRATION OF UNTREATED TOXOID AND
ALUM PRECIPITATED TOXOID IN A PARALLEL SERIES

Toxoid Administered	Number Observed	Per cent Showing Reaction	Local Reaction Per cent Showing				Systemic Reaction Per cent Showing			
			No Reaction	Mild	Moderate	Severe	No Reaction	Mild	Moderate	Severe
Alum Precipitated	50	68.0	52.0	40.0	8.0	0.0	58.0	38.0	4.0	0.0
Untreated	43	67.4	51.2	39.5	9.3	0.0	58.1	37.2	2.3	2.3

Table VII shows the comparison of the local and systemic reactions observed in these two groups, according to the classification of mild, moderate, and severe. This comparison shows a great similarity in the two groups, both in local and systemic reactions.
Table VIII shows the correlation between local and systemic reactions in the two groups. The two groups are indistinguishable in the per cent showing no reaction, local or systemic only, or local and systemic combined. There is no evidence that the reactions follow-

alum precipitated toxoid during this study and only one individual developed an abscess at the site of injection. This occurred in a Schick positive white, female, 11 years of age, who gave a history of previous immunizing treatment with toxin-antitoxin. There was a severe local reaction following the administration of the toxoid with abscess formation on the 5th day. The abscess drained spontaneously and healed rapidly.
Recently in Virginia, a high percentage of abscesses were found follow-

TABLE VIII
OBSERVATION ON THE REACTION FOLLOWING THE
ADMINISTRATION OF UNTREATED TOXOID AND
ALUM PRECIPITATED TOXOID IN A PARALLEL SERIES

Toxoid Administered	Number Observed	Per cent Showing			
		No Reaction	Local Reaction Only	Systemic Reaction Only	Local and Systemic Reactions
Alum Precipitated	50	32.0	26.0	16.0	26.0
Untreated	43	32.6	25.6	18.6	23.2

ing the use of a single lot of alum precipitated toxoid. All abscesses were confined to those having received toxoid bearing this particular lot number. In a group of 112 individuals receiving 1 c.c. of alum precipitated toxoid bearing this lot number, 12 had abscesses which required surgical attention. Material was cultured from each one of these abscesses and in all instances was found to be sterile. This occurrence was reported to the National Institute of Health for investigation.

Experience with the use of alum precipitated toxoid in Virginia would seem to indicate that abscess formation need not necessarily be expected following its use.

CONCLUSIONS

One dose of alum precipitated toxoid

of a potency of 12.5 flocculating units per c.c. or greater produces over 90 per cent immunity in known Schick positive individuals.

There is not a significantly greater reversion to the Schick positive state in individuals rendered Schick negative by alum precipitated toxoid than in Schick negative individuals rendered Schick negative by natural causes or following other diphtheria immunizing agents.

Reactions following the administration of alum precipitated toxoid are not of sufficient severity to limit its use, nor are these reactions of greater severity than those following the administration of untreated toxoid.

REFERENCE

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Medical Slang

WORSE than medical jargon is medical slang. The best type of medical writing is that which appears in the case report. The use of the word "gut" for intestine or the plural of the word for the other contents of the abdominal cavity may be considered a medical affectation quite as bad as "the acute abdomen." When the surgeon says he did a "chronic appendix," when the gynecologist speaks of "an abdominal woman," when the dermatologist "puts the patient on iodides," or when the internist says the patient "runs a swinging temperature," they are speaking medical slang. The gynecologist would hesitate to speak of doing a Caesar when he performs a caesarean operation.

These are some of the specific ex-

amples cited by Hurter, and there are many more in *The Art and Practice of Medical Writing*.

In the field of medical science, many men have gained note by their ability to express themselves in good English succinctly, rhythmically and accurately. The opportunity is available, for everyone who cares to take the trouble and the time, to perform competently in the field of medical letters. Experts assert that there are hardly a hundred competent medical writers in our country today; some authorities insist that there are hardly more than 10 or 12. In the field of preparation for sound literary expression, particularly, preliminary education to medical training seems to be failing miserably.—Editorial, *J.A.M.A.*, Sept. 15, 1934, p. 842.

Health Education in Germany*

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IT is a great honor for me to speak to you about Health Education in Germany. If there is anything in which you are specially interested, I hope that I may have an opportunity to answer questions afterwards.

I have no special personal philosophy regarding health; a man is healthy who can perform all the duties required by his nation, his profession, and his family. It is not enough only to be healthy. Those persons living only for their health, as they say (I call them health-hypochondriacs) have not a great interest for the health educator. Such persons have "eine falsche Gesundheit" . . . they do not eat to be satisfied, but rather to obtain the proper amount of calories and vitamins.

One question for a health worker, who does his work on a scientific basis is the following: What can be done by education? What health factors are determined by heredity, and what influence can social conditions have? If health workers would obtain success they must, of course, give consideration to such factors, which I will not take time to discuss here.

About Germany—There is one great difference between this country and my home. Germany is an old country, nearly 2,000 years old in its history. There are many different native racial tribes—Prussian and Bavarian, Silesian,

and people from the Rhine, have different hereditary backgrounds. The greatest difference is in regard to the population. The area of the States is 18 times greater than that of Germany. It is better to say that the State of Texas is a little larger than all of Germany, but in Germany there are 66 million people, as compared with 2 million in Texas.

WHAT IS THE AIM OF HEALTH EDUCATION IN GERMANY?

I think there is a new idea of health education since the Great War in those countries which have suffered much through the war and due to its consequences. Millions of people have learned, and have been led to appreciate the value of life, and the value of health.

Health Education in Germany seeks to teach the individual to value life, not to throw it away—to regard it as a trust. To us the aim of education for health is: the healthy man, the man physically and mentally well balanced, who knows and perceives what is beneficial for him, who recognizes health as a most precious gift of life, always worthy to be striven for.

If there is any right of health for every citizen there is also a duty for each to strive for vigorous health. We say in Germany, "Der einzelne ist nichts; die Volksgemeinschaft ist alles." To be healthy is nothing—to maintain yourself to work for the national welfare, that is everything.

* Read before the Health Officers Section of the American Public Health Association at the Sixty-third Annual Meeting in Pasadena, Calif., September 3, 1934.

The persons in Germany doing the work of health education are, first, the health officers. There are health officers of the State called "Kreisarzt," and health officers of great towns, "Stadt-artz." Some rural districts have also county health officers for preventive medicine and health work. The Reich recently adopted a new law "bringing all health work under one sole direction." Now there must be in each town and county a state health officer; formerly it could be, but it did not have to be. In the Reichministerium of Interior there is a special department for health service, including health education.

The second chief-worker in health education is the teacher. I think in many cases the teachers are better trained for health education than the doctors. In Germany the work in health education in the school is done by the teachers. There is another method in England by which the health officer lectures in the school. I do not know how it is in this country.

We should not forget the parents. More important than knowledge about health and hygiene is the education for healthy habits, and that must be done by the parents in the first 5 years of childhood. We have a German proverb, which is, "Was Hanschen nicht lernt, lernt Hans nimmermehr." "What little Jackie does not learn—adult Jack would never learn." We have so-called "Mutterschulen" and there are special evening classes where the fathers come also. Home nursing not only requires a kind heart, but also a clever hand and a clear head. People are seldom born with these qualities, but with proper instruction they can easily be acquired by most men and women.

We have in Germany a law which requires the registration of tuberculosis and venereal diseases. If any person is ill of one of these, the doctor must give the patient's name to the health officer who gives the sufferer and his

family special instructions about the sickness, how to cure it, and so forth. Our new state laws provide a great opportunity for personal work in health education, especially in eugenics—not to forget the Health Insurance Institutions and many private organizations dealing with alcoholism, tuberculosis, and venereal diseases. There are also special institutions in Germany, "Die Berufs Schule." These are of great importance in our health education work. Boys and girls from 14 to 17 have to learn many things about health; for example, the instruction given to girls, how to nurse the babies. The German Arbeitsdienst, similar to your CWA, is one of the best opportunities for adult education between 18 and 25. They are given gymnasium each morning, swimming, hiking, and so forth, with instruction in first aid. In Germany we have such organizations for girls also, but they are voluntary.

The methods of Health Education are, I think, quite the same in Germany as in your country. More and more we prefer intensive work between individual and individual. We have also extensive health campaigns—but we do not believe much in their success. You can give great figures of how many millions of pamphlets you distributed and make a good impression on laymen, and from time to time it is valuable to have big exhibits. I must tell you a little story. We had a great hygiene exhibit in Dresden, 1930–1931. Several days we looked around with the well known Mr. and Mrs. Routzahn. One day he asked: "Would it not be better to have a smaller exhibition than a big one?" "Yes," I said, "but we had 10 small ones and no Mr. Routzahn came from America to see them, but now we have the big one and Mr. Routzahn has come to Germany."

The means of Health Education are so many that it is not possible to speak now about them. The best is the

spoken word—from individual to individual. Our medical practitioners have almost forgotten it. An old medical sage says: "You can cure a man by remedy and by word." I think there must be more educational work by the medical practitioners. You cannot help a man alone by giving him a prescription, or doing an operation.

The printed word, pamphlets, books—We need them but they have not so great an influence. Better are pictures, lantern slides, films. We prefer lantern slides for instruction, and films for health propaganda.

THE WORK OF THE DEUTSCHES HYGIENE MUSEUM

Our Museum was founded in 1912. The year before the first International Hygiene Exhibition was opened at Dresden. This exhibition was the pioneer in giving hygienic instructions to the masses of the people. In 4 months more than 5½ million visitors saw the exhibition. The greatest success was the department, *Der Mensch* (Man). Since then the Museum has steadily developed into a central institution for public health. The new home of the Deutsches Hygiene Museum was opened in the year 1930. Its fundamental aim is laid down in a memorial pamphlet by the founder, Dr. Lingner, who said:

The Deutsches Hygiene Museum is to be a place of instruction for all, where everyone may acquire instruction necessary for healthy life. The exhibits are to be arranged in such manner that laypeople may understand them with the help of simple explanations. The construction of those models is a highly scientific work and a specialty of the scientific department.

The focus of the Museum is the collection, *Der Mensch*, with a separate room for the so-called "Transparent Man." It is really a wonderful model, made of a kind of celluloid, and the inner organs such as the heart, lungs,

brain, and so on are lighted up automatically one after the other. The twenty museum-halls housed in two different floors, cover nearly 6,000 sq. m., or 7,500 sq. yds. The collections of the Museum deal with biological-hygienic instruction, the anatomical and physiological foundations of physical exercise, the care of mother and child. There is a special division for eugenics and for the problem of right nourishment. Industrial hygiene and the protection of workers have their places. Quite modern is the room *Health and Sickness*. The problem of modern biological science, as constitution, disposition, and the influence of surroundings upon health are here demonstrated in a most instructive manner.

This is followed by the department of such infectious and contagious diseases as tuberculosis and venereal diseases. A special room deals with the problem of cancer. Two combined historical and ethnographical groups show the hygienic and non-hygienic life in classical times and in the middle ages, and also those things which are interesting as hygienic usages in the life of natives such as the negroes in Africa, the Indians, the Chinese people and so on. A special room is reserved for temporary exhibits, which are changed every month.

There are not only these exhibition rooms; there is also a school for expectant mothers, a cookery school especially for special diets; there are rooms for classes in first aid, and for evening classes; there is a gymnastic room, and also a library with a large collection of 3,000 illustrated posters from all parts of the world.

There is one unique characteristic of the work of the Deutsches Hygiene Museum. All the exhibits are made in our own special workshops, whether pictures, placards, lantern-slides, models, anatomical preparations (after Prof. Spalteholz') wax models. There are new models of celluloid, unbreakable,

not affected by heat or cold, much lighter than wax, and cheaper by one-third.

Another aspect of the Museum's work is of great interest for public health workers. After the war the Museum sent out several itinerant exhibitions. In 1919-1920 people were badly undernourished, and in consequence many died of tuberculosis. The Museum started a special exhibition to teach people how to avoid tuberculosis, and advised them to consult a doctor in good time. It was also necessary to have an exhibition enlightening people on venereal diseases. Since then there have been shown many traveling exhibitions in most towns and villages of the Reich. They are called: "Fight Cancer," "Right Nourishment," "Healthy Women—Healthy Nation," and so on.

There is also an automobile exhibit with a special tent, serving as an exhibition hall wherever the car stops. Dr. W. W. Peter calls this automobile the "Healthmobile." It travels through the rural districts of Germany, staying 2 to 3 days in each place to show the people of the district how to live healthily. Twenty million visitors have seen our exhibits in Germany. The traveling exhibits are also taken abroad. The Museum has shown its exhibits in many towns of Switzerland, Austria, Czechoslovakia, in Sweden, Norway, Hungary.

The appreciation which the Museum's work has met, is further proved by several requests to organize new museums or to lend certain important exhibits to different countries. Many

such requests were granted as in the case of the museum at Klausenburg (Roumania). Also the Egyptian Government commissioned the Museum to organize a museum in Cairo. It is the same with the Yugoslavian Government: we organized two museums there at Belgrade, and one at Agram. The Hygiene-Section of the League of Nations requested the Museum to arrange material for medical education at Warsaw, Moscow, and Charkow. It may be known to you that there are many models of the Deutsches Hygiene Museum in the scientific halls of the Century of Progress Exposition in Chicago.

Nearly 700,000 lantern slides, 350,000 illustrated posters, and many thousand casts and models from the Museum are used throughout the world. The Lantern Slide Service alone has more than 100 series, and each has from 50 to 60 slides concerning all branches of public health. They are employed in schools and for special lectures. One can hire or buy them, and they can be used in any country no matter what its language.

These are some of the services which it has been the privilege of the Deutsches Hygiene Museum to perform in its homeland and abroad. The institution is a tangible evidence of the vision and faith of its founder in the efficacy of visual methods in health teaching. The fight against sickness and unhygienic conditions knows no territorial boundaries. In this work the Deutsches Hygiene Museum is glad to be associated with health educators in America and in other parts of the world.

Health Problems Connected with the Ethylene Treatment of Fruits*

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CONSUMERS are prone to judge the quality of fruits by the appearance. Nicely colored oranges, bananas or peaches which are attractive to the eye will sell better than an equal or even better quality of the same fruits not so well colored.

For ages therefore fruit shippers have endeavored to improve the color of their wares by polishing, waxing, wrapping in colored paper, holding in warm humid atmospheres and other devices. However, nature affords many examples where color is not correlated with quality or even maturity. For instance, the California Valencia orange is better colored in January or February before it is mature than it is at the height of its maturity in August, for as soon as hot weather sets in the stem and blossom ends of this fruit begin to turn green. If the consumer will pay more for well colored fruit the growers and shippers of that fruit will do their utmost to secure the premium paid for appearance. While undoubtedly the ethylene treatment is used for this very purpose, the events leading up to its discovery come wholly from another line of endeavor; namely, attempts to avoid freezing of the fruit during packing and shipping.

In the Tulare County, Calif., orange district in the early days of orange shipments kerosene stoves were used in the packing sheds, and in a few cases, in the cars in order to avoid danger of frost injury. One or two fires in transit, and the railroads put a stop to their use in cars. Shippers state that at first they had no other purpose than to keep the fruit warm, but eventually noticed that fruit heated in this way developed a better color than that packed without heating. Kerosene stoves were used solely for the reason that they were available and afforded the cheapest source of heat. Some enterprising but unfortunate individual built a heating plant using steam in place of the cumbersome kerosene stoves, and discovered to his dismay that he could get no better color in this way than if the fruit were not heated. Very soon the use of kerosene stoves became universal in citrus packing houses. Gas and the exhaust from automobiles and motorcycles were also used. In 1912 Sievers and True, Bureau of Plant Industry *Bulletin* 232, U. S. Department of Agriculture, proved that the combustion gases were responsible for the increase in color of fruit exposed to them.

Various methods were employed to apply these combustion gases, blue flame burners were placed in the coloring rooms surrounded by the oranges in

* Read before the Food and Nutrition Section of the American Public Health Association at the Sixty-third Annual Meeting in Pasadena, Calif., September 6, 1934.

boxes just as they had come from the field. The stoves were placed in basements under the coloring rooms, the gases ascending through the latticed floors, and finally the stoves were placed in cement houses outside the packing houses and the fumes circulated by means of fans and conduits to the coloring rooms. The latter method was an improvement over keeping the stoves in the rooms where with the best of attention the fruit was too often covered with soot from smoky burners. An idea prevailed at this time that the more evil smelling the atmosphere in the coloring rooms the quicker the coloring would take place. The atmospheres were often so acrid and tear compelling that the rooms had to be ventilated for some time before the workmen could enter without being subject to headache and other discomforts.

A later development was the installation in Tulare County of a set-up for making carbon monoxide, by injecting steam into incandescent coke. Not only was this a serious menace to the workmen but was a failure as a coloring agent. Up to this time the coloring of fruit was more or less haphazard. The results were never certain, the fire risk was high and the care of the stoves troublesome.

We began our investigations of the coloring problem in 1918 by ascertaining the constituents in the atmospheres of the coloring rooms. Owing to the variety of conditions encountered great difficulty was experienced in drawing conclusions from the data obtained. The coloring efficiency was not correlated with carbon dioxide or carbon monoxide, unsaturated hydrocarbons or with any other constituent or factor which we could recognize. Finally by separating the different groups of constituents from the combustion gases of the kerosene stoves it was discovered that the unsaturated compounds were those having the property of improving the color of the

fruit. As ethylene and acetylene were the unsaturated compounds present in greatest quantity, they were given first trial. Apparently both gave satisfactory results but further investigation proved that purified acetylene was not effective. In all probability traces of ethylene in the acetylene had accelerated the coloring. Fortunately ethylene was being produced commercially, having been used during the war in the manufacture of poison gas. It was found that ethylene in dilutions as high as 1 part in 2,000,000 would noticeably accelerate the coloring of black green lemons. For commercial practice on citrus fruits, 1 part in 5,000 to 10,000 parts of air seemed to give most satisfactory results. That high dilutions of the gas were efficient was also fortunate for even at the maximum strength recommended, 1 part to 1,000, 30 times that amount would have to be used before an explosive mixture would be obtained. In 1923 Dr. F. E. Denny, who had been working in our laboratory on this investigation secured a public service patent covering the method.

Commercially the gas is dispensed in cylinders containing from 25 to 30 lb. (about 300 cu. ft.) under pressures of 1800 lb. per sq. in. The method of operating is to place the fruit in packing boxes, stack the boxes in a reasonably gas-tight room in such a way that the circulation of air about them will not be hindered. The gas is then run into the room through a flow gauge or other measuring device until the proper proportion is reached. The rooms are thoroughly ventilated and recharged every 6 to 12 hours, depending on weather conditions. Where continuous ventilation is used the gas is permitted to "trickle" into the air current. During hot weather this system has the advantage of keeping the temperature in the treating rooms within a reasonable range.

Ordinarily citrus fruit will color in

from 2 to 5 days under this treatment and will soften sufficiently for satisfactory packing.

The treatment of other fruits is essentially the same. With pears and the Japanese persimmon 1 part of gas to 1,000 of air is used although 1 in 5,000 would probably work as well. In 4 to 6 days pears soften, become yellow and are in excellent shape for canning. With pears the chief object of the treatment is to save sorting. Left to themselves, pears would require from 10 days to 2 weeks to soften and would do so unevenly. This uneven maturity could be taken care of by sorting, but at extra expense and with some loss in the grade, for at each sorting a few of the pears are sure to be bruised.

In the case of persimmons, from 48 to 96 hours will do the trick, softening them, coloring them and removing the astringency better than if they are kept in storage until soft.

Our personal experience with tomatoes has not shown a profitable use for ethylene. It has been reported as used with satisfaction by some shippers and jobbers. We have also had reports on its successful application to bananas.

The latest development, one upon which we are now working, is the use of the gas for removing the hulls from walnuts. In order to secure the best quality the walnuts in some districts of California should be harvested as early as possible. If they are harvested early, however, there will be a considerable percentage of "sticktight" nuts—in other words those from which it is almost impossible to remove the hull. Treatment with ethylene causes the hulls to become friable so that they are readily removed by the various hulling devices.

The changes produced by ethylene are solely those which would have been brought about by nature in a somewhat longer time and less uniformly. Whether this hastening of the natural

reactions is due to activation of the enzymes contained in the fruit or whether it is caused by a changed permeability of the tissue which allows the enzymes to come in contact with and change the natural constituents, is difficult of proof. We have never encountered a change which is not a natural one. The process is often called a coloring process, which in one sense is a misnomer. It does not add color but destroys chlorophyll by the usual processes of nature and leaves the natural color of the fruit in its place. This is illustrated by the changes in both citrus fruits and persimmons. No matter how long grapefruit or lemons are treated with ethylene they will not assume an orange color. When the chlorophyll is destroyed through the indirect action of the gas only the natural color of the fruit remains. Oranges which are harvested before maturity, when treated rarely develop a good orange color but are more of a lemon yellow than orange. Persimmons gathered too early will not yield a satisfactory color on processing, but will be dull reddish brown instead of red.

Contrary to popular belief, neither the sugar nor acid of citrus fruit is changed by the treatment. It has been a common practice in some packing houses to set aside or treat fruit that does not reach the maturity standard required by law, in the belief that in a few days it will gain in sugar or lose in acid enough to pass the test. Sometimes such changes are supposedly brought about by ethylene treatment or by storing. In such cases, however, irregular sampling is the cause of the apparent change. No matter how many adverse results have been secured the packer will base his conclusions on one favorable test, when a few more tests would show him the fruit as a whole had not changed.

In some fruits where nature has provided material from which sugars are

produced by natural processes, such changes will take place during the treatment. Bartlett pears and bananas contain starch which even after the fruit is picked will change into sugar. Ethylene will bring about this change in pears in 4 to 6 days, whereas if left to stand it would take from 10 days to 2 weeks to accomplish the same result. The treated pears will be uniform in color and texture, whereas the untreated will not.

In the case of the Japanese persimmon the changes in the tannin compounds are likewise much more uniform in the treated fruit. The astringency will entirely disappear during treatment with no traces left, as is common when the fruit matures naturally.

If our conclusions are correct and only the natural reactions take place on treatment, there is little to be said on the health problems connected with the process.

However, the question of the hazard to health may be considered from 2 points: (1) the dangers to the workers in the fruit packing plants or canneries; (2) the consumers' risk in eating the treated material. We have never noted the least inconvenience among our own or other workers from breathing the usual dilutions of the gas employed. It is well known that ethylene is an anesthetic and that ethylene-air mixtures are explosive. As an anesthetic it is mixed with oxygen in ratio of 4 parts of gas to 1 of oxygen. Explosive mixtures must contain from 3 to 25 per cent of ethylene in air, so that a mixture 30 times as strong as that recommended would have to be used before the danger point for explosion would be reached, and 800 times before there would be danger of anesthesia. The insurance and indemnity companies have gone into the matter thoroughly and permit the use of the process in insured buildings under certain restrictions.

Under the second heading it could

be conceived that danger might come from impurities in the gas absorbed by the fruit and carried to the consumer in this way. Impurities common to ethylene amount to about 2 per cent, 75 per cent being ethane, a saturated hydrocarbon gas not so active chemically as ethylene. Traces of carbon dioxide, propane, acetylene, and acetone also occur. All are probably quite harmless in the dilutions in which they occur. Acetone and acetylene are present in the treating room atmosphere in the proportion of 1 part per 1,000,000. It would appear therefore that the hazard from this source is negligible. It is within the realm of possibility that the reactions caused by the gas within the fruit might form injurious compounds. We have not discovered any reactions caused by the treatment that would not take place naturally in a longer time.

Another phase of the question which must be considered is the possible effect of ethylene on the vitamin C potency of the juices made from fruit treated by the process. A thorough investigation of this question has been made by experts in the Department of Agriculture.* Tests were made on fruit picked at the same time from the same tree, part of which was allowed to stand at room temperature, and part treated with ethylene immediately after picking. The fruit was picked from all sides of the tree so as to obtain specimens of approximately the same size and maturity. The two lots were analyzed on the same day, being titrated with a suitable indicator to determine the reducing value of the juice and thus give an index of vitamin C content. The following results were obtained:

Control sample, immediately after picking 7.11 ± 098

Control sample, after holding at room temperature 7.19 ± 094

Treated sample $7.03 \pm .102$

These data indicate no significant

* Unpublished data, this Bureau.

difference between the reducing values of the juice from oranges treated with ethylene and from similar fruit not treated. The indications are, therefore, that the vitamin C content of the fruit is not affected by the ethylene treatment.

The concealment of inferiority by coloring is more a question of fraud than of health. With few exceptions fruit harvested before it is commercially mature will not color satisfactorily. We have had complaints from those interested in child feeding that the fully colored oranges they were getting were too sour and caused digestive disturbances in children. These complaints are usually received at the time when it is necessary to switch from the summer crop to the winter crop or *vice versa*. The crop which is closing is thoroughly matured fruit low in acid. The new crop naturally is higher in acid even if

it is commercially mature. There is no way to avoid the change unless canned or frozen juice can be substituted for the fresh. This can be done now with the assurance that the full vitamin C content of the juice is preserved and that a satisfactory flavor will be found. Commercial maturity is defined by state laws in both Florida and California. The provisions are liberal and the fruit which will pass the standards is not satisfactory to everyone. On the other hand, not all fruit which becomes fully colored on the tree would be satisfactory to everyone.

In conclusion we feel that the ethylene process has deservedly found a place in the preparation of fruit for the market, that it is harmless, and that with proper state and federal regulation little if any fraud can be perpetrated through it.

Buy Christmas Seals



Help Fight Tuberculosis

"Little Red" Cottage

THE Christmas Seal this year commemorates the 50th anniversary of the beginning of modern sanatorium treatment in the United States by the late Dr. Edward Livingston Trudeau at Saranac Lake, New York, in February, 1885. The one room cottage the seal depicts became the nucleus of the sanatorium movement in this country. Today there are 659 sanatoria containing a total of 86,917 beds. The cottage, called the "Little Red" because of its color, is preserved at the institution founded by Dr. Trudeau, which today bears his name.

Pleo-Antigenicity of Proteus X19^{*}

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IN a previous study Welch and Poole¹ reported the finding of a pleo-antigenic variant occurring spontaneously in a stock strain of Proteus X19. It was demonstrated that both the spontaneous variant and an artificially induced variant would agglutinate in antisera for members of the Shigella, Eberthella and Salmonella groups of organisms whereas the parent Proteus X19 strain was inagglutinable in such sera. Further study indicated the phenomenon was not due to acquisition of new antigenic components by these variants but that the parent Proteus X19 strain had in its makeup similar agglutinogens although not demonstrable by direct agglutination. The presence of these agglutinogens could be demonstrated, however, by the production of the corresponding heterologous agglutinins in sera of animals inoculated with the parent strain. In this connection, Mackenzie and Fitzgerald² have demonstrated that antigenic components not demonstrable in the original parent culture may appear in variants of organisms of the Salmonella and Shigella groups.

Because of the wide use of Proteus strains by diagnostic laboratories in the Weil-Felix reaction it seemed of practical importance to study in a similar

manner strains † obtained from various sections of the United States and Canada in an attempt to determine whether other strains in use had similar characteristics to the one previously reported. Nineteen of these strains were being used diagnostically; 5 were labelled as variants when received. The morphology, biochemistry and serology of 22 strains from this country and 2 from Canada have been studied and are reported on in this paper.

MORPHOLOGY

Microscopic—Each strain was studied microscopically using direct smears from the original agar slant culture. There were marked variations in morphology. In many cultures Gram-positive staining organisms were present although Gram-negative short bacilli predominated. In 17 of the 24 cultures studied long filamentous forms were evident ranging from approximately 2 per cent to 90 per cent of the organisms in each microscopic field.

† Strains designated by names of states, provinces, National Institute of Health, and New York City are used diagnostically in the Weil-Felix reaction in these official laboratories. The 4 Storrs strains were obtained from the Department of Bacteriology of Connecticut State College. Three of these were known variants originally obtained from Dr. Philip Hadley. The HXX and OXX (Kingsbury) strains were obtained from the Harvard Medical School. Department of Bacteriology and Immunology, with information that these had been received recently from Dr. A. Felix of the Lister Institute. The strain designated Norton was received from the Department of Bacteriology of the Upjohn Company of Kalamazoo, Mich. The authors express their appreciation to all who kindly furnished the cultures for this study.

^{*} Read before the Laboratory Section of the American Public Health Association at the Sixty-third Annual Meeting in Pasadena, Calif., September 3, 1934.

TABLE I
BIOCHEMICAL REACTIONS OF 20 PROTRUS X STRAINS

[illegible]

This was particularly true of the National Institute of Health Strain 504 which on receipt showed a majority of interwoven filamentous forms with only a few shorter rods. In most cases where filamentous forms were observed definite Gram-positive granules could be distinguished. Although cultures varied in morphology from short, fat rods to long, narrow, filamentous forms, there was nothing sufficiently clear-cut to separate these strains into groups on a morphological basis.

Macroscopic—The colonial study of all strains was made on eosin-methylene-blue agar for a 72 hour growth period at 37° C. On this medium 15 strains developed a definite metallic sheen similar to that produced by *Escherichia coli*, some strains producing this sheen within 24 hours. Of the 9 strains showing no metallic sheen, 4 were known variants. In most instances at least 2 distinct types of colonies developed, ranging from 1 to 5 mm. in diameter—one usually clear, colorless, raised, glistening, entire and convex; the other opaque, blue to black in color, raised and convex with erose edges. Between these extremes were several gradations in color, size, and morphology.

In an attempt to determine whether there existed in these 24 strains under study variants similar to the one previously reported,¹ more than 150 colonies were fished from eosin-methylene-blue agar plates, and further studies made of the biochemical and morphological characteristics of the resulting strains. In no instance were we able to isolate in this manner directly from the cultures, variants of the type mentioned above.

In broth (pH 7.2) all cultures grew moderately well showing an even turbidity with small amounts of flocculent precipitate in the bottom of each tube in most instances. Hanging-drop preparations were made on 3, 8, and 24 hour broth cultures and, although it

has been demonstrated³ that the 'O' antigenic component is the reacting factor in the Weil-Felix reaction, 17 of the 24 strains studied were found to be motile. The results of the motility studies are given in Table I.

In studying the histories of the 24 strains interesting information was obtained regarding the condition of the cultures from a motility standpoint. On the basis of the source from which the cultures were originally obtained the 24 strains could be divided into 4 groups. In the first group were 3 strains: New York 211, Ontario, and Quebec, all of which, the histories indicate, were originally obtained from Dr. H. Mooser of Mexico City who designated these cultures as "O1." At the present time only one culture (Ontario) is non-motile. In the second group there were 12 strains all of which, according to the accompanying histories, were obtained at various times (1919-1932) from the National Institute of Health. Five of these were non-motile: National Institute 504, Connecticut, New Jersey (2 cultures—both National Institute 18), and Alabama. (In the history obtained with this last strain it was noted that some difficulty had been encountered with this culture and it had been found necessary to fish non-motile colonies after plating it out.) The American Type Collection, Massachusetts X2, Massachusetts X19, Norton 50, California, Ohio, and New York 32,276 strains were all motile. In the history of the latter it was noted "strain 32,276 was received from the National Type Collection in 1932 and was listed in their 1931 catalogue as 3,138-O derived by Weil and Felix from their 3,137-H." In the third group were placed 4 strains for which no history was obtainable, all of which were motile. These were Wisconsin, New York City, Storrs X19, and Michigan. In the fourth group were placed the 5 known variants; 4 of these were motile

TABLE II
AGGREGATION OF PROTEIN X STRAINS WITH 12 PURIFIED PROTEIN X19 STRAINS

Organisms	Connecticut	New Jersey	Michigan	Massachusetts	Quebec	Wisconsin	California	Ohio	Alabama	National Institute	New York	Ontario
Connecticut	2,560*	5,120	2,560	2,560	2,560	1,280	2,560	5,120	5,120	5,120	2,560	2,560
New Jersey (1)	2,560	5,120*	2,560	5,120	5,120	1,280	5,120	2,560	2,560	5,120	2,560	2,560
Michigan	1,280	5,120	5,120*	5,120	10,240	640	5,120	5,120	5,120	10,240	5,120	10,240
Massachusetts X19	5,120	10,240	10,240	5,120*	10,240	2,560	10,240	10,240	5,120	10,240	5,120	5,120
Quebec	2,560	5,120	2,560	2,560	2,560	1,280*	5,120	2,560	2,560	2,560	2,560	5,120
Wisconsin	1,280	5,120	2,560	5,120	2,560	1,280	2,560*	5,120	2,560	5,120	5,120	2,560
California	1,280	5,120	2,560	5,120	2,560	1,280	5,120	5,120*	2,560	5,120	2,560	2,560
Ohio	1,280	5,120	2,560	5,120	2,560	1,280	5,120	10,240	10,240*	10,240	5,120	10,240
Alabama	5,120	10,240	10,240	10,240	5,120	2,560	10,240	5,120	10,240	10,240*	10,240	10,240
National Institute of Health 501	10,240	20,480	10,240	5,120	10,240	2,560	5,120	20,480	5,120	5,120	5,120*	5,120
New York State 211	2,560	10,240	10,240	5,120	10,240	1,280	5,120	5,120	10,240	5,120	5,120	5,120*
Ontario	1,280	5,120	10,240	5,120	5,120	1,280	5,120	5,120	5,120	5,120	5,120	2,560
Storrs X19	2,560	10,240	10,240	2,560	10,240	2,560	2,560	2,560	2,560	5,120	2,560	2,560
American Type Collection	1,280	10,240	5,120	5,120	2,560	1,280	5,120	5,120	2,560	5,120	5,120	2,560
New York State 32276	2,560	5,120	10,240	5,120	5,120	1,280	2,560	5,120	5,120	5,120	5,120	2,560
New Jersey (2)	1,280	5,120	5,120	5,120	5,120	2,560	5,120	5,120	5,120	2,560	2,560	2,560
New York City	1,280	2,560	5,120	2,560	5,120	2,560	5,120	5,120	5,120	20,480	5,120	10,240
Massachusetts X2	5,120	10,240	10,240	10,240	10,240	2,560	5,120	10,240	10,240	20,480	5,120	10,240
Norton 50	2,560	5,120	5,120	10,240	2,560	1,280	20,480	10,240	5,120	20,480	5,120	0
Storrs Rough Mucoid	0	0	0	20	20	0	40	0	0	0	40	0
Storrs Mucoid	100	20	40	0	40	0	80	80	0	40	0	0
Storrs Smooth	0	0	0	80	40	0	40	0	80	40	80	0
OXR	0	0	0	0	0	0	0	0	0	0	0	0
UNK	0	0	0	20	20	0	20	0	0	0	100	0

* Homologous titers.

(HXK-(Kingsbury), Storrs Rough Mucoid, Storrs Mucoid, and Storrs Smooth), and 1 strain was non-motile, OXK-(Kingsbury) strain.

This portion of the investigation indicates definitely that *Proteus* strains to be used diagnostically in the Weil-Felix reaction must be checked for motility at reasonable intervals if such cultures are to be maintained in the proper and most efficient state. In connection with this our investigation would indicate that diagnostic *Proteus* strains should be carried in stock cultures on media from which the water of condensation has been removed by dehydration since the presence of this water apparently increases the possibility of the development of motile variants from what was originally a non-motile strain.

On Krumwiede's triple sugar medium an acid and gas butt and an acid slant were produced by 20 of the 24 strains. Two strains showed an acid butt without gas and an acid slant, both of which produced gas in small quantities in carbohydrate media. The other 2 strains produced acid and gas butts and alkaline slants.

BIOCHEMICAL REACTIONS

All 24 strains after being tested for purity were inoculated into carbohydrate media (sterilized by filtration) and examined each day for 18 days. The biochemical reactions are given in Table I. In general, except for the known variants, acid and gas were produced in dextrose, sucrose, salicin, maltose, cellobiose, xylose and galactose. Lactose, mannitol, rhamnose, arabinose, raffinose, inositol, dulcitol, sorbitol, adonitol and dextrin were not fermented by most strains. However, 8 cultures produced acid in glycerol. The HXK and OXK strains failed to ferment salicin and maltose. The Storrs Smooth and Storrs Mucoid strains failed to ferment salicin, but did ferment maltose

(one of these, Storrs Smooth, produced acid and gas in arabinose). The New York City* strain, which according to its history had been carried in stock 22 years, showed the greatest amount of variation from the typical *Proteus* fermentation, producing acid and gas in lactose, arabinose, and raffinose. The carbohydrate reactions of this particular strain are similar to the reactions of certain strains of *Escherichia coli*; however, in the serological studies of this strain definite agglutination in high titers were obtained with *Proteus* X sera. Apparently long cultivation on artificial media had brought about these variations from the original type. The American Type Collection strain did not produce gas in carbohydrate media. Most strains were able to grow in Koser's citrate medium. The Voges-Proskauer test was negative with all 24 strains, which gave positive methyl-red tests and reduced nitrates. Six strains failed to produce indol and 16 liquefied gelatin. The reactions in litmus milk ranged from acid to neutral, and 3 cultures, all variants, showed peptonization.

SEROLOGICAL STUDIES

In order to test the serological relationship of the strains under study, 12 rabbits (free from natural agglutinins) were injected every day over a period of 12 days with increasing doses of live organisms. The 12 strains chosen for preparation of sera were: Connecticut, New Jersey 1, Michigan, Massachusetts, Quebec, Wisconsin, California, Ohio, Alabama, National Institute 504, New York 211, and Ontario. The homologous titers of these sera varied between dilutions of 1:2,560 to 1:10,240 with the exception of the Wisconsin serum which developed a titer of only 1:1,280.

* A duplicate of this culture was obtained from the New York City Laboratories 3 months after this work was completed. Identical results were obtained.

The results obtained when testing the 24 strains against these prepared sera are given in Table II. In these sera in most instances the *Proteus* strains, except for the known variants, gave agglutinations which approached very closely the homologous titers. On the other hand, the variants agglutinated only slightly or not at all.

Agglutination of Known Variants in Heterologous Sera—Since in our previous study it was demonstrated that variants of *Proteus* X19 strains would agglutinate in heterologous sera, all the known variants used in this study were tested against *Eberthella typhi* (Michigan), *Eberthella typhi* 'O' (New York), *Shigella paradysenteriae* Army, *Salmonella schottmuelleri* and *Salmonella enteritidis*. The OXK and HXK strains showed practically no

agglutination with the above heterologous sera. Only slight agglutination was obtained with the Storrs Smooth and Storrs Mucoid organisms, whereas the Storrs Rough Mucoid organism showed definite agglutination in all 5 heterologous sera, the titers varying from 1:80 to 1:320.

Agglutination of Heterologous Organisms in Known Proteus Sera—All 12 of the *Proteus* sera prepared were tested for heterologous agglutinins using the following organisms: *E. typhi* (Michigan), *E. typhi* 'O' (New York), *Shigella paradysenteriae* Army, *Salmonella schottmuelleri*, and *Salmonella enteritidis*. Five of these *Proteus* sera (Michigan, Ohio, National Institute 504, Connecticut, New Jersey 1) showed agglutinins for all the above heterologous organisms, ranging in titers from

TABLE III
ABSORPTION OF ELEVEN PROTEUS X19 SERA WITH HETEROLOGOUS ORGANISMS

Proteus Sera	Organisms	Average Titers
Unabsorbed: Michigan—Ohio—National Institute 504 Connecticut—New Jersey (1)	<i>E. typhi</i> Michigan	160—640
	<i>E. typhi</i> 'O' New York	160—320
	<i>Salmonella schottmuelleri</i>	80—160
	<i>Salmonella enteritidis</i>	80—640
	<i>Shigella paradysenteriae</i> Army	80—160
Absorbed: Michigan—Ohio—National Institute 504 Connecticut—New Jersey (1), each: with <i>E. typhi</i> (Mich.) <i>E. typhi</i> 'O' (N.Y.) <i>Sal.</i> <i>schottmuelleri</i> , <i>Sal. enteritidis</i> & <i>Shigella</i> <i>paradysenteriae</i> Army respectively:	<i>E. typhi</i> Michigan	0
	<i>E. typhi</i> 'O' New York	
	<i>Salmonella schottmuelleri</i>	
	<i>Salmonella enteritidis</i>	
	<i>Shigella paradysenteriae</i> Army	
	Homologous sera strains	2560—10240
Unabsorbed: Quebec—Ontario—New York 211— California—Alabama and Massachusetts (X19)	<i>E. typhi</i> (Mich.)	0
	<i>E. typhi</i> 'O'	
	<i>Salmonella schottmuelleri</i>	
	<i>Salmonella enteritidis</i>	
	<i>Shigella paradysenteriae</i> Army	80—160
Absorbed: Quebec—Ontario—New York 211— California—Alabama and Massachusetts X19 each with <i>Shigella paradysenteriae</i> Army	<i>Shigella paradysenteriae</i> Army	0
	Homologous sera strains	2560—10240

NOTE: The absorption of each of the above 11 *Proteus* sera with homologous organisms removed completely both homologous and heterologous agglutinins. The 12th sera (Wisconsin) prepared showed no

1:80 to 1:640; 6 *Proteus* sera (Quebec, Ontario, New York 211, California, Alabama, and Massachusetts) showed agglutination only with *Shigella paradysenteriae* Army with titers ranging from 1:80 to 1:160; 1 strain (Wisconsin) did not develop demonstrable agglutinins for any of the above heterologous organisms. These results are included with the agglutinin absorption tests in Table III.

On the basis of these results the 12 *Proteus* strains were divided into 3 groups. In Group I were placed the Michigan, Ohio, National Institute 504, Connecticut, and New Jersey strains, each capable of developing agglutinins for 5 heterologous organisms; in Group II were placed the Quebec, Ontario, New York 211, California, Alabama, and Massachusetts X19 strains, each developing agglutinins for *Shigella paradysenteriae* Army only; in Group III was placed the Wisconsin strain which did not develop agglutinins for any of the 5 heterologous organisms with which it was tested.

Agglutinin Absorption—Our previous study of heterologous agglutinins in a *Proteus* X19 serum had shown that these agglutinins were bacterial group agglutinins and not due to the presence of heterophile components also present. In order to obtain further information regarding the source of the heterologous agglutinins in 11 of the 12 *Proteus* sera prepared for this study, each serum of the *Proteus* strains in Group I was absorbed with each of the 5 heterologous organisms for which agglutinins had been demonstrated. Each *Proteus* serum in Group III was absorbed with 1 heterologous strain, *Shigella paradysenteriae* Army. Each serum after absorption was titrated for heterologous and homologous agglutinins.

Agglutinin Absorption Method—The agglutinating serum was diluted to a degree depending on the titer of heterologous agglutinins. These dilutions

varied from 1:10 to 1:20. Six ml. of the diluted serum was added to a 24 hour agar slant of the organism under study. With a platinum needle, the suspension was carefully emulsified in the serum. A small pledget of sterile absorbent cotton was dropped into the test tube and the suspension drawn up into a pipette. The cotton acted as a filter for gross particles. The suspension was pipetted directly to a sterile centrifuge tube, incubated in a water bath at 37° C. for 2 hours, and then centrifuged at high speed for 1 hour or until supernatant fluid was clear. The supernatant fluid was then pipetted under sterile conditions onto a second 24 hour slant culture and the procedure repeated. The procedure was then repeated on a third slant. (This third suspension may be placed in the ice box over night with equally good results.) Absorption with homologous organisms using this technic is usually complete.

The results of the absorption of 11 *Proteus* sera with heterologous organisms are given in Table III. It will be noted that in general the titers of unabsorbed *Proteus* sera with heterologous organisms ranged between dilutions of 1:80 and 1:640. The absorption of these sera with heterologous organisms removed not only the agglutinins of the absorbing strain but also all other heterologous agglutinins known to be present. These results indicated that we were dealing with group agglutinins. Since no heterologous agglutinins were demonstrated in the Wisconsin serum no absorptions with heterologous organisms were made.

In an attempt to determine whether the 12 *Proteus* strains for which no sera were prepared had heterologous antigenic components, representative sera of Groups I and II (above) were absorbed with each of these strains. The absorbed sera were then titrated for heterologous agglutinins. Consid-

erable difficulty was encountered in effecting complete absorption for the absorbing strain in several instances. This was particularly true of the representative sera chosen from Group I. However, heterologous agglutinins were removed with comparative ease from Group II sera which contained the *Shigella paradysenteriae* Army agglutinins only.

The OXK and HXK strains did not remove heterologous agglutinins from the sera of either Group I or Group II indicating that these 2 strains do not contain antigenic components similar to those in the heterologous organisms studied. On the other hand, satisfactory controls of these absorptions were not possible due to lack of agglutination of these 2 organisms in the sera employed.

The Storrs Rough Mucoid, Storrs Mucoid, and Storrs Smooth strains absorbed heterologous agglutinins from a representative serum of Group I, indicating these organisms contain antigenic components in common with all the heterologous organisms studied. Two of these, the Rough Mucoid and Mucoid variants, also absorbed heterologous agglutinins from Group II serum. The Storrs Smooth strain, however, failed to do so but its titer in the serum was so low that no satisfactory control was possible and this result was, therefore, inconclusive.

The Storrs X19, American Type Collection, New York State 32,276, New Jersey 2, New York City, Massachusetts X2, and Norton 50, strains did not absorb heterologous agglutinins consistently from Sera of Group I but did absorb heterologous agglutinins from sera representative of Group II in all instances. This suggests that these strains do not contain heterologous agglutinogens similar to those present in the sera Group I but do have the *Shigella paradysenteriae* Army component corresponding to that in Group

II. Since no sera were prepared for these 7 strains, we do not feel that the results are consistent enough to warrant definite classification of these particular strains into groups. Although there is some evidence from this portion of the investigation that the group agglutinogens present in Group I differ from the *Shigella paradysenteriae* Army agglutinin in Group II, it was found that the absorption of Group I sera with strains representative of Group II, and *vice versa*, removed in the former absorption all heterologous agglutinins and in the latter, as would be expected, the component for the Army strain. In view of these results, it would appear that the organisms in Group II not only contain the Army antigenic component but also components (although masked) for the other heterologous organisms evident in Group I since the absorption of a Group I serum with a Group II strain removed completely the heterologous agglutinins present in this serum.

AGGLUTINATION WITH SERA FROM CLINICAL CASES OF ROCKY MOUNTAIN SPOTTED FEVER

In order to determine the efficiency of these strains in the Weil-Felix reaction—sera * from known clinical cases were titrated against all 24 *Proteus* strains used in this investigation as well as a variant described in a previous paper (*loc. cit.*). With the 19 diagnostic strains the titers were roughly comparable and in no case did we find any marked differences. The variant strains, however, with the exception of Storrs

* We are indebted to R. R. Parker, Ph.D., Special Expert of the U. S. Public Health Service, Rocky Mountain Spotted Fever Laboratory, Hamilton, Mont., for these sera. Since completion of these results several typhus sera have been received from H. Mooser, M.D., Pathologist, American Hospital Laboratory, Mexico City, Mexico, and from S. W. Bohls, M.D., Bureau of Laboratories, Texas State Department of Health, Austin, Tex. The results obtained with these sera were comparable with those obtained with the sera received from Dr. Parker. The authors express their appreciation to all who furnished sera for this study.

Rough Mucoid showed no agglutination in dilutions greater than 1:80. The Storrs Rough Mucoid strain showed titers of 1:160 to 1:320, which were comparable in many instances with titers obtained with normal diagnostic strains.

DISCUSSION

The finding of pleo-antigenic variants of a *Proteus* X19 strain was reported previously. At that time the importance of the phenomenon to public health workers induced us to continue this investigation in a study of diagnostic strains from the United States and Canada in an attempt to determine whether other strains either had present in them dissociates or the inherent capacity for producing them as evidenced by the presence of heterologous agglutinogens which can be demonstrated only by animal injection (Welch & Poole¹). In this study two major problems presented themselves: (1) To study the morphology of the cultures to determine the possible occurrence of variants and to identify them definitely as such; (2) to determine whether there were present in the sera from these strains components for heterologous organisms.

It was found that the 19 diagnostic strains on receipt in these laboratories did not contain variants comparable to the one previously described. Some morphological and biochemical differences were noted but these could not be correlated with differences in serological behavior. It was found, however, that only 6 of the 19 diagnostic strains were non-motile in spite of the fact that in several instances the motile strains had been obtained from originally non-motile cultures. For example, the Ontario, Quebec and New York 211 strains were all originally obtained from a single source. In this investigation the Ontario strain was the only one of these 3 retaining its original non-motile

characteristics. This in itself is indicative of the necessity of making frequent checks on *Proteus* X cultures used for diagnostic purposes which should be preserved in a non-motile state. An alternative to this is the use of an alcoholized suspension prepared according to the method of Bien and Sonntag.¹

Since sera for only 12 strains were prepared, definite proof of the presence of heterologous agglutinogens could be obtained only for these strains and the antigenic make-up of the remaining strains could only be inferred from cross-absorption studies. Our results indicated that heterologous agglutinogens were present in 11 of the strains for which sera were prepared. Although it was possible from an interpretation of these results to divide these organisms into 3 groups depending upon the number of heterologous components present, we do not feel that our inability to demonstrate certain antigenic components by direct agglutination in sera of organisms of Group II obviates their presence, especially since absorption of Group I sera with Group II organisms removed all heterologous agglutinins from the Group I sera. Apparently antigenic components in common with the *Eberthella* and *Salmonella* groups are present in the Group II strains in addition to 1 of the *Shigella* group but these are more effectively masked or more firmly fixed than in Group I. We found no evidence for the presence of heterologous components in the 1 strain in Group III. The major points brought out by the serological studies are: (1) that in general the *Proteus* X strains studied contain heterologous agglutinogens which may not be demonstrable by direct agglutination, and (2) that the variants studied are not agglutinable to any degree in sera from clinical cases and, furthermore, may contain free heterologous agglutinogens which may cause confusing, nonspecific reactions if present in diagnostic cultures. Our re-

sults with the 19 diagnostic strains used as antigen for the Weil-Felix reaction in sera from known clinical cases indicated their suitability for this purpose. On the other hand the variants with the exception of Storrs Rough Mucoid showed very slight or no agglutination with these sera.

The presence in the *Proteus* strains studied of heterologous agglutinogens which are demonstrable on injection into animals, coupled with the fact that dissociation of the organism may free these agglutinogens (previously demonstrated) so that they may be demonstrated by direct agglutination, indicates the necessity of a periodic morphological and serological examination of these strains. The use of such examinations will eliminate inagglutinable, spontaneous dissociates from the cultures, insure the retention of the strains in a non-motile state and disclose the presence of any free heterologous agglutinogens.

SUMMARY AND CONCLUSIONS

1. The morphological and biochemical characteristics of 19 diagnostic *Proteus* X strains and 5 variants are reported in detail. Marked differences in these characteristics were not noted except for the finding of 13 motile strains in the diagnostic group.

2. Heterologous antigenic components in common with the *Shigella*, *Eberthella* and *Salmonella* groups were shown in 11 *Proteus* X strains. Although these

were not demonstrable by direct agglutination in heterologous sera, they were demonstrated in the antisera produced by them on injection into rabbits or failing this, by their ability to absorb heterologous agglutinins from other *Proteus* sera containing them. Only 1 of the strains for which sera were prepared showed the entire absence of heterologous components.

3. The heterologous agglutinins present in *Proteus* X sera were shown to be bacterial group agglutinins.

4. Known variants of *Proteus* X strains were shown to be practically inagglutinable in sera from clinical cases of Rocky Mountain Spotted fever and, in addition, certain of these variants would agglutinate directly in heterologous sera.

5. On the basis of these findings it is recommended that *Proteus* X strains used in the Weil-Felix reaction be checked at least once a month to insure working with a non-motile culture and at least once each quarter to exclude spontaneously occurring variants.

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POLIOMYELITIS IN CALIFORNIA

WE have already said that the symposium on poliomyelitis was perhaps the most interesting single feature of our recent meeting in California. While we intend to give our readers the benefit of these papers which go into the details of the various questions involved, on account of the wide interest in the epidemic, it seems that we should at once give a bird's-eye view, so to speak, of the situation.

At once it may be said that the peak of the epidemic occurred in June, and since then, there has been a steady and marked decline, though cases have continued to appear, chiefly in Los Angeles City and County. Many more cases than usual have been seen in other parts of the state, especially Fresno County, and apparently there has also been some spread to the states contiguous to California. San Francisco, usually regarded as the largest city in the state (though the editor was recently called to order by some southern Californians on account of this statement) has been very free, and for some time past has run from 1 to 3 cases per week, the report for the week ending September 15, 1934, showing no cases.

There are several features of this epidemic which are unusual. Beginning in May, it was earlier than most poliomyelitis outbreaks. There has also been a decided shift in the age period of those affected. Five epidemics have occurred in California, beginning with 1912. That year 78 per cent of the cases occurred in children under 8 years of age, while for 1934 to date, only 44 per cent have been under 10 years of age, and the number of adults affected has been comparatively large.

The mildness of the disease has been characteristic. In San Francisco, with a small number of cases, the death rate has been 6.8 per cent; in Fresno County, which continues to have the largest number of cases next to Los Angeles County, the death rate has been 2.3 per cent, while in Los Angeles County, it is only 1.5

per cent. As of the 6th of September of the year 1934, there have been 2,732 cases.

An outstanding feature of this epidemic has been the high infectivity, as shown by the high percentage of households which had multiple cases, 22 per cent of all cases having occurred in such households.

The high infectivity of this outbreak is also shown by the great number of doctors, nurses, other attendants and workers about the hospital who have become infected. In Los Angeles, where 95 per cent of the cases were hospitalized in the General Hospital, 137 such infections have taken place, the greatest number having been among the doctors (15), nurses (58), and student nurses (39).

Apart from the epidemic in general, great interest attaches to the methods of prevention and treatment. In the General Hospital, 121,000 c.c. of serum, approximately 55,000 of which was from convalescents, were used. Blood was also taken from normal adults over 30 years of age. Whether from convalescents or from normal persons, the serum from 10-20 individuals was pooled. It was preserved chiefly by a 1:10,000 solution of merthiolate, and was always kept 5 days before use. Both aerobic and anaerobic cultures were made from each lot. There was no control as far as treatment went, since the authorities did not feel that it was justifiable to withhold serum from any patient. As far as its prophylactic use, there was some control, owing to the refusal by a certain number of persons to accept it. There is some difference of opinion as to its effect. Some feel that the symptoms were milder in those who received serum, and instances of relapses are given, 3 in one case, in which each time there was a marked and rapid amelioration of symptoms after the administration of serum. There were fewer cases of muscular involvement and paralysis among those who received serum, though the number of cases is too small to admit of positive conclusions. The one point which seems to stand out clearly is that there was no difference in value between adult serum and convalescent serum. There were no marked ill effects, though there were some cases of more or less severe serum sickness, and in some, acute pain at the time of infection, especially in those in whom the administration was intramuscular. So far as figures go, the prophylactic use of serum was not successful. Employees who received serum showed a slightly higher degree of infection than those who did not, and this was true also of those working in the Contagious Disease Unit.

It should be clearly recognized that all reports so far must be regarded as preliminary. We have the spectacle of a community provided with well manned hospitals, amply sufficient for ordinary and even peak loads, being very rapidly overwhelmed by an epidemic of unusual proportions. The illnesses among doctors and nurses cut down the personnel and forced the employment of medical and advanced students in some types of work.

Needless to say, all sorts of conditions have been incriminated, such as swimming pools, bathing beaches, milk and water supplies, etc. If one thing stands out more clearly than another according to present information, it is that personal contact is responsible for the spread. Of those working in the Contagious Disease Unit, 14 per cent were infected as against 4.5 per cent for other parts of the hospital.

The papers from the Symposium will appear in an early issue of the Journal

PREVENTION OF FLY BREEDING

- WITH SOME NOTES REGARDING INSECT-BORNE DISEASES

IN 1931 the League of Nations Health Organization requested schools of hygiene to study flies and the best methods of treating manure heaps to prevent their propagation.¹ The Nancy Institute of Hygiene felt that this was especially deserving of its attention because of the fact that many parts of France were unfavorably known from the hygienic standpoint for the heaps of stable manure, often containing also the excreta of both normal and sick human beings, which stand before the houses along the streets in the villages. During the World War improvement was forced by the military authorities, but the farmers have returned to this ancient custom which dates back to immemorial times, and seems to be due in part to the actual structure of the old villages and the topography of the country.

The report contains much that is of interest. Experimental work has shown that individual flies without distinction of origin may carry from 60,000 to 25,863,000 germs, and in the case of flies captured near manure heaps, an even greater number. A large proportion of these organisms are colon, indicating the fecal source of the pollution. The report gives in some detail the methods by which these numbers were determined. Other experiments showed that milk (500 c.c.), when a single fly is placed on the surface, and left in contact with it for 30 minutes, then kept for 24 hours, will contain as many as 10,220,000,000 germs per c.c.

The authors have studied the effect of exposure to the sun as a method of sterilization of flies. When individuals taken from town flats and which showed 2,540,000 colonies at the time of capture were exposed for 2 hours to the sun, the number fell to 160,000. In flies taken near manure heaps and which showed at the time of capture 32,560,000 germs, only 6,720,000 remained after similar exposure to the sun, showing the destruction of 25,840,000 bacteria. From these experiments they hold that the bactericidal action of the rays of the sun is extremely powerful. Needless to say, it varies with the season, and the authors point out that their experiments are valid only for the months of July and August, when the light was most intense.

The report closes with a consideration of some methods of preventing breeding of flies in manure. In treating manure the agricultural value must not be destroyed, as it is one of our most valuable fertilizers. The authors favor the so-called Roubaud's biothermic method, and show that a temperature of 60° C. can be obtained in manure heaps by fermentation. They describe also a method in which by watering once or twice a day, a still higher temperature is reached, a desirable feature, since larvae, probably under the influence of the heat of fermentation, tend to come to the surface. They advocate the construction of 3 water-tight chambers with a ventilation shaft protected with wire gauze, a trap door for filling and a door for emptying, a sloping floor with channel to convey the liquid content to a cemented tank. Such an arrangement, which they describe in some detail and illustrate, does not destroy the fertilizing value of the manure and appears to accomplish the desired result.

As far as one can judge from the report, the authors are happily oblivious of the enormous number of studies carried out by Americans, of which we can mention only a few. As far back as 1897, L. O. Howard, Chief of the U. S. Bureau of Entomology, began to work on the subject. In July, 1914,² there was

published a bulletin on the subject, the result of consultations with other members of the department, and a large amount of careful work. The prevention of fly breeding in manure was the chief point of attack, and the preservation of the fertilizing value of manure was kept in mind. For this purpose treatment with borax 0.62 lb., or 0.75 calcined colemanite to 10 cu. ft. (about 8 bushels) was recommended. In May, 1915, an excellent bulletin was published by William B. Herms.³

As far as the carrying of disease by the house fly goes, Americans should remember the report of the commission composed of Victor C. Vaughan, E. O. Shakespeare, and Walter Reed, Vaughan alone surviving long enough to make the report. This was a study of typhoid fever during the Spanish-American War in 1898. It was clearly shown that in the camp at Chickamauga Park the food was contaminated by flies which had fed on fecal matter in the latrines and traveled from there to the tents. Many studies since have shown that the fly is capable of carrying many other diseases, and does so in some cases, particularly those of the intestinal tract.

The work of the Merchants' Association of New York deserves particular attention, 2 notable volumes having been published, the first⁴ in 1907, and the second⁵ in 1909. The first of these is a report of a careful experimental study by an expert. The second is a collection of opinions and facts obtained from a large number of health officers. Both, however, show that nearly 30 years ago even a body of laymen in this country had appreciated the danger of the fly to public health, and taken preventive measures against it.

America has been keenly alive for many years to the danger not only of the fly, but of insect carriers of disease. We can go back to 1848, when Dr. Josiah C. Nott incriminated the mosquito as a carrier of yellow fever. Dr. Carlos Finlay (1881) believed that he had proved the agency of the mosquito now known as the *Aedes aegypti* as a vector. This was finally proved by the U. S. Army Commission headed by Walter Reed, who made its first report in 1900. The first positive proof in the world that we know of concerning the agency of insects in carrying disease was given in 1893 by Theobald Smith, of the U. S. Bureau of Agriculture, when he showed that a tick carried Texas fever to cattle. McCoy, and other officers of our Public Health Service, made extensive studies of bubonic plague, and added much to our knowledge of its mode of spread, though to Ogata, 1897, belongs the credit of first showing the agency of the flea in transmitting the disease now known as tularemia. In 1919, Francis showed that the so-called deerfly fever was due to *B. tularensis*, harbored in jack rabbits and conveyed to man by the bite of the fly, *Chrysops discalis*. Rocky Mountain spotted fever, transmitted by the *Dermacentor andersoni* and *D. modestus* has also been worked out chiefly by Americans, and of late years chiefly by members of our Public Health Service, which now maintains a special laboratory for the purpose. The names of Wilson and Chowning (1902), King (1906), Ricketts (1906), Parker and Spencer (1923) are inseparably associated with our knowledge of this fatal disease.

Craig, in 1907, held that dengue was due to a filtrable virus and conveyed to man by a mosquito. A U. S. Army Commission, Siler, Hall, and Hitchens, gave final proof that the intermediate host is the *Aedes aegypti*. We also owe much of our knowledge of typhus fever to American workers. Ricketts and Wilder, Goldberger and Anderson, Maxcy, and the American Red Cross Commission, 1922,

deserve mention. Wilder, in 1911, produced strong evidence that the body louse was the exclusive infecting agent.

An American Commission also did good work on trench fever during the World War (1917), though credit for having discovered the cause of the disease must be given to McKee, Renshaw and Brunt, of England (1916).

In bringing up these matters, we do not mean in any way to belittle the excellent report to the League of Nations which has led to this discussion, nor the splendid researches done by scientists of other countries, but we are convinced that our people are entirely too prone to forget work done on this continent and to praise that done by foreigners. Even our leading medical journals are guilty of this fault. While Americans are sometimes described as bumptious and aggressive, we have been guilty of not giving due credit to our scientific men, at least as far as literature goes. "Honor to whom honor is due."

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4. Jackson, Daniel D. Pollution of New York Harbor as a Menace to Health by the Dissemination of Intestinal Diseases through the Agency of the Common House Fly. *Report to the Commission on Pollution of the Merchants' Association of New York*, Dec., 1907.
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THE CCC CAMPS

ALL those interested in public health have been watching with much interest some of the efforts being put forth by the New Deal. Pretty nearly all of these have had a shower of brickbats thrown at them, some perhaps deservedly. One great exception is the CCC camps.

There was much incredulity when these were organized, the first one being near Luray, Va., in 1933. Since that time the number has increased to 1,643.

Attempts to get accurate figures from Washington have failed. There can be no doubt, however, that upward of 500,000 young men have been directly affected through their experience in these camps. Their moral tone has been raised, their health improved, and much done in the way of education to fit them for citizenship. It is known that thousands of young men have left home and have been tramping all over the country for want of something better to do. The CCC camps have helped in this situation, though much remains to be done.

Apart from the men themselves, it is stated that 315,000 families have received from \$22 to \$25 a month from the young men in the camps whose basic pay is \$30 a month. It is safe therefore to say that considerably more than a million people have been directly helped through the operation of this Corps. It has overcome the incredulity and opposition felt at the beginning, and seems to have won a high place in the estimation of the public.

PUBLIC HEALTH EDUCATION*

"Whereas . . . Be It Resolved"—The resolutions passed at the Pasadena meeting of the A.P.H.A. may well be scrutinized for leads by him who writes or speaks—as well as by him who plans in the department or association.

Some of the resolutions seemed to point to popular health education subject matter. Some resolutions become copy material only after they have been passed upon in relation to department policies and programs. But they are worth looking into.

The Unusual at Pasadena—The space available for scientific and educational exhibits was so generous and the response was so enthusiastic as to set a new record in extent and variety of material for study offered to delegates. Doubtless many of us will look forward to what will be available at Milwaukee in 1935. *It all depends upon what the public and private agencies—national, state and local—will plan for during the months ahead.*

Flashes and Close-Ups—At Pasadena we caught flashes of ideas and projects which have not been revealed to health education workers in other states and cities. We managed to take a few notes and hope to write a few letters. But such efforts by the editor will cover but a small section of the unknown.

Why not be able to say: "We do our part" and "We have shared"?

We are sure that *Journal* readers

would value details of the colored-paper-on-map technic developed by Guy P. Jones, and the staff information service conducted by Miss Brown of the Los Angeles County Department, and Virginia Wing's "charm" campaign, and some details of what Dr. Galdston hinted at in the Members' Meeting. These are but samples of what we hope to receive from readers in all states and provinces *and* countries.

Give us close-ups, please.

"There Are No Dull Subjects"?—Signed "Little Sunshine" comes a flareback from the quotation in the September issue of the *Journal*:

There is something about your column that always incites me to comment.

On a busy day in the early fall I picked up your respected contribution to the *A.J.P.H.* (page 979) and what hits me in the face—me, a struggling, overworked, dried out editor? (Quote) There are no dull subjects; only dull writers (Unquote, and insert "there are" before second "only")! Slap! Just like that. All right. I challenge you.

Write me a brief very undull description of the aims of your A.P.H.A. department: Public Health Education.

Thank you.

I now take the great liberty of reversing your quotation and replacing the emphasis, to wit, namely:

"There are no dull writers; there are only dull subjects which have been placed in this world to eliminate all but the good writers." The trick then is to avoid the dull subjects lest they prove your Waterloo.

Who will be knight for the editor fair and take up this challenge? Who will write that "undull description of the aims" of the Public Health Education Section?

Possibly we should first set down those aims—dull or undull—unless

* Please address questions, samples of printed matter, criticism of anything which appears herein, etc., to Evert G. Routzahn, 130 East 22d St., New York, N. Y.

someone will both set the aims and describe them.

In another month or so the editor of this department will think up worthy awards for any and all who take up this challenge on his behalf. We await chivalrous volunteers.

A Course in Adult Health Education—Master of Science in Public Health will be conferred on students of adult health education by the University of Michigan. "Graduate Programs in Public Health: 1934-1935-1936" announces the following course of study, with hours of credit noted at the right:

First Semester

Hygiene 201, Physiologic Hygiene—3
 Hygiene 204, Vital Statistics—3
 Education B182, Current Studies in Adult Education—2
 Journalism 101, Feature Writing—3
 Sociology 121, Community Problems—2
 Speech 131, Advanced Public Speaking—3
 —total hours—16

Second Semester

Hygiene 202, Community Health Problems—3
 Hygiene 206, Public Health Law and Administration—3
 Hygiene 210, Adult Health Education—2
 Journalism 56, Community Newspaper—3
 Sociology 147, Social Psychology—3
 —total hours—14

Courses recommended for substitutions and additional preparation:

Journalism 51, 52 (prerequisites), Journalism 55, 102
 Speech 132, Advanced Public Speaking
 Sociology 111, 113, 116, 132, 147
 Political Science 141, 142, Municipal Government

Hygiene 102, 107, 115, 118, 208, 209, 211
 Education C102, C108, A125, A207

For further information, write to Dr. John Sundwall, Division of Hygiene and Public Health, University of Michigan, Ann Arbor.

At Your Finger Tips—Literally so is much health information through the Health Knowmeter which origi-

nated with the Association of Women in Public Health.

Hundreds of classified facts are supplied in question and answer form on mimeographed sheets. This material may be clipped and pasted on cards and filed for easy, quick reference by teachers and others. Address: Mary R. Lakeman, M.D., Health Knowmeter Comm., 100 Nashua St., Boston, Mass.

The American Medical Association has prepared for display at fairs, expositions, etc., questions and answers taken from *Hygeia* and copied on visible index cards.

This idea might be worked out by a teacher or health worker, clipping or copying questions and answers from a file of *Hygeia*.

"Why Not Let Them Die?"—"Health education needs a good housecleaning to do away with many superstitions that have grown up around it. In *Journal of Outdoor Life*, June, 1934, and again in *Michigan Out-of-Doors*, Lansing (July-Sept., 1934), Dr. Warren Forsythe discusses this subject.

The popular understanding of personal health rules needs a lot of debunking by the application of science.

Much of the traditional subject matter of personal hygiene has no better basis of truth than folklore, half baked ideas or personal opinions associated with an emotional bias.

Observations at Pasadena—Here is the first reply to a request for observations of the Public Health Education Section in action:

What seemed important to me:

The varied interests of those who attended the section meetings.

That increasing thought must be given to enriching Section programs because of these varied interests.

A consciousness of those who attended that most public health activities have a health education content.

That large numbers of persons are interested in techniques and materials.

Another commentator noticed that

certain speakers and some of the participants quite forgot the theme of the session. Or, possibly they simply took the opportunity to "get something off their chests."

A lack of an eager curiosity was noted by this same observer. Few speakers can anticipate all of the needed practical angles of what they present. Usually questions from the audience are needed to secure well rounded presentations. And usually, there were not enough of such questions. Did the speaker fail to interest us? Were we willing to guess at what was left unsaid? Did we fail to note the omissions? Were we sitting without thinking, waiting to be filled up without effort on our part?

Nevertheless, adds the editor, we had good papers; many eager, enthusiastic audiences; and the very special privilege of meeting numerous western comrades who seldom venture to the eastern meetings.

They Did Bring Address Cards— But some of the printed address cards left at Education and Publicity Headquarters at Pasadena *named no city*. We have seen a few letterheads, annual reports, and even survey reports with no mention of a city. What amazing modesty.

Teaching in a Clinic—How to make the most of a clinic for health education? One answer is given by Frances F. Hagar in a discussion of the most productive nursing service with a limited personnel:

Probably the most important function of the clinic is teaching. This is a point that will bear a most searching and intelligent study. Consider the whole set-up of the clinic. Is it planned so that the teaching may be done in a systematic manner? Has the nurse delegated responsibilities to her assistants in such a way that she is free to supplement the teaching of the doctors and to explain matters which might be somewhat

confusing to some persons? Is the teaching conducted along such a line that it might replace the costly home visit? How much demonstration material is used for teaching? A certain amount can always be used to advantage. Is group teaching a practice? The group conference is a very practicable method of teaching. Through discussion, many points are stressed which might be lost in the individual conversation. The group conference combined with the individual conference is particularly well adapted to the antepartum service.

In order to make clinics more productive, then, might it not be worth while to have a critical analysis of this service. Study it from all angles to see where it might be improved in the matter of time and work of personnel, as these relate to the amount of service which can be rendered in a given community.

In *Child Health Bulletin*, Am. Child Health Assn. (Sept., 1934), 50 W. 50th St., New York, N. Y. Single specimen copies to non-members, 10 cents.

Fewer Figures, More Interest—A recent state fair exhibit of Ohio State Department of Health was

. . . not so elaborate, or diffuse, as some that have gone before, and did not run so much to statistics as most of them; but it spoke its piece in easily understandable language, and drew—and held—the crowd accordingly.

New among its features, a real "sign of the times," was the occupancy of a booth in the departmental space in the Manufacturers' Building by official representatives of the Ohio Federation of Women's Clubs, who distributed several thousand pieces of literature, including as major items material on children and diets and the three major degenerative diseases—cancer, heart disease and diabetes. Their presence in the departmental space is the first step in the Federation's campaign in promotion and support of official health agencies, state and local.

Departmental literature was handled at the other end of the departmental display, and a large sheaf of signed requests resulted, calling for several thousand pieces of printed health material. . . .

An attractive model of a modern sanitary swimming pool attracted much attention and resulted in many questions. Vital statistics was presented in a few crisp statements of fact, instead of in many columns of figures. The essential facts sought to be enforced

were "driven home" under the new method in a way which no column of figures could do. The new method, therefore, is a great improvement over the old.

Chest films of tuberculosis, in shadow-boxes, added much interest to the display of the Bureau of Tuberculosis, which was not without other attractive features. The departmental laboratory was another division which made the major part of its display in new guise. Instead of having several microscopes, worth hundreds of dollars, on the table for the curious to use in exploring the depths of drops of water, blood, etc., for "bugs" and corpuscles, there were drawings in color of the microscopic field, showing the different types of germs, drawn to scale and of large size, prominently displayed. . . .

Dr. Johnson's model sanitary privy, built on the grounds northwest of the building which housed the other features, attracted a constant stream of visitors and, coupled with the placarded table of materials and costs, and explanations by those in charge, resulted in the actual sale of many and the probable sale of several thousand. These privies are being constructed as a feature of federal relief work in more than 60 Ohio counties.

Other divisions of the department were represented by "small but effective displays."

"Three Health News Features"

—Under this heading, in *News Bulletin* of Social Work Publicity Council, (Sept., 1934), 130 E. 22d St., New York, N. Y., appears the following:

A series of brief health editorials are being supplied to the *Cincinnati Times-Star* by the Cincinnati Public Health Federation. They appear every day under the heading "Save a Life," and a tailpiece "Perhaps Your Own." Monotony is avoided by having the articles cover all sorts of subjects connected with public health, including the prevention of accidents, particularly motor ones. A typical one reads:

"About 60,000 people die annually in the United States of pneumonia. A great many of these deaths could be prevented if people would take better care of themselves. A bad cold is often the forerunner of pneumonia. If you catch a cold, don't neglect it. Go to bed if you can, but above all don't perform exhausting work, remain in a draft, or subject yourself to exposure in bad weather. And call your doctor promptly if there is fever."

Starting in mid-August, out in Honolulu, the *Hawaii Hochi*, a daily newspaper published in Japanese and English is running a bi-weekly two-page child health supplement, sponsored by Palama Settlement and the local Tuberculosis Association. We are watching with interest, as other plans of this kind have not always worked out successfully. So much depends on the delicate balance of good faith from both sides. James G. Stone writes us: "We sense the possible danger of unreliable advertising, so it has been agreed that all advertising copy for this special supplement shall also be approved by us. The names of potential advertisers are being submitted to us for approval before the advertising department makes the contact with the advertisers. All proprietary remedies have been definitely ruled out."

A restrained factual article, "Plague," in the *Baltimore Evening Sun*, Aug. 13, 1934, shows H. L. Mencken in a new mood. He discusses in useful paragraphs the problems in the control of syphilis. He even mentions social workers without any derogatory comments: "Since the War it (syphilis) has been widely discussed by medical men and social workers, and the old taboo upon any mention of it has largely broken down." This change in the general attitude toward syphilis and the change on the part of the medical profession so that the regulations on reporting it to health departments are being more carefully followed out are the bases of Mr. Mencken's article. His name, as author, should have a good deal of weight with Baltimore newspaper readers.

Getting Acquainted with County Commissioners—A possible weak point in the support of the public health agency is the educational work done with legislative and budget-making bodies—city, county and state.

Dr. C. H. Douthirt states some examples of omission, then says:

I suggest that every health officer in the state attend every regular meeting of the county commissioners. It isn't necessary to stay all day, but go in, sit down with them and discuss the health work in the county. Tell them what you and the nurse are doing, your plans and problems; give them copies of your reports to the state and your mileage reports. Ask for suggestions and criticisms. Tell them you want to cooperate with them and then show that you mean it by attending their meetings. Get acquainted with your county commissioners; they are all good fel-

lows, and more than that they have been selected by the people to run the business of the county.

In *New Mexico Health Officer*, Santa Fe, Aug., 1934.

Where to Write for Help—Some teachers may be encouraged to seek supplementary references and materials for their classes. Other teachers are compelled to seek whatever material they need because none is officially provided or suggested.

In *Hygeia* (Oct., 1934) Dr. Thomas D. Wood says:

Under any circumstances finding the best helps for health teaching is a stimulating, challenging and somewhat difficult or complicated game for the classroom teacher.

Dr. Wood tells of the part taken by supervisors or counsellors, when there are such. Then

Health knowledge as differentiated from health teaching methods involves a wide range of authentic information regarding the many aspects of health.

The sources for such material discussed by Dr. Wood include governmental agencies, national health and welfare associations, commercial or business organizations, and popular monthly and weekly as well as daily periodicals. Some of the pitfalls are pictured.

To those who may consider the suggestions or advice in this article lacking in definiteness, let it be confessed that the writer believes firmly that teachers in many instances cannot be sure of the best places to look for help for health teaching without expert advice in this field, which is fundamentally the most important and at the same time the least exact of the applied sciences.

We are glad that Dr. Wood has emphasized this need of "expert advice." There was no space for him to have gone further, but we hope that he or someone else will attempt to point out in a future article just how teachers may go about getting the right kind of help from local and other authorities,

and how local groups of teachers may make up for the absence of competent supervisors.

October, 1934, *Hygeia*—Here are a few of the topics presented in this issue:

What is sinus trouble? (how it may be prevented, what to do for it). The handicapped child (what the parent should and should not do). Food fads and faddists (a debunking of some well known diet theories). The head louse (one of Our Parasites). Common sense in mouth care (about brushes and brushing). New books on health. Questions and answers.

School and Health includes: The place of the textbook in health education. Where may teachers look for help in health teaching? New health books for teachers and pupils.

Syndicated Health Education—The annual "Directory of Features" in *Editor and Publisher*, Times Bldg., New York, N. Y., lists health columns by the following authors now being sold to newspapers by syndicates and services:

Drs. Logan Clendening, Morris Fishbein, Royal S. Copeland, Sophia Brunson, W. F. Thomson, Iago Galdston, William Brady, Michael Shuman, H. J. Hoare, C. N. Chrisman and James W. Barton—and Dr. Frank McCoy. (Sept. 29, 1934. 10 cents.)

Damaged Lives No Longer Sponsored—Next month we will explain how undesirable promotion of the "Damaged Lives" motion picture has caused American Social Hygiene Association to withdraw its sponsorship.

Please report to the Association, 50 West 50th St., New York, N. Y., any showings of the picture.

CORRECTION

Under "Magazine Articles" (June, 1934) the price of *Today* should be 10 cents a copy.

DISCONTINUED

Health Officers' World, Milwaukee, has been temporarily discontinued, and no copies are available of issues we have mentioned.

EVENTS AHEAD

Roll Call of the American Red Cross in November, and the Christmas Seal Sale of tuberculosis associations in December are of special interest to health agencies.

The 1934 Mobilization for Human Needs, Oct. 28 to Nov. 11, particularly concerns health agencies in community chest cities.

The National Tuberculosis Assn. announces that it sent to state tuberculosis associations early in September samples of the materials to be used in the E.D.C. for 1935. The slogan and keynote: "Fight Tuberculosis With Modern Weapons." Objective: to spread information about treatment.

Quackery and fads still thrive; worn out theories and health fetishes still obstruct scientific treatment. It is our opportunity to dispel the unsound and displace it with the exceedingly hopeful story of modern treatment.

We now enter the season of state social work conferences. Probably all of them will have one or more health sessions. They are not likely to give time to health education unless health workers in the states take the initiative.

FOR EDUCATION AND REFERENCE

"Half a Century of Warfare against the Typhoid Fever Bacillus" is a brief summary, with diagrams, offering usable material for copy. *Statistical Bulletin*, Metropolitan Life Insurance Co., 1 Madison Ave., New York, N. Y.

Monthly Letter, Housing Information Bureau, Welfare Council, 122 E. 22d St., New York, N. Y., is a mimeographed bulletin with housing news from all over the country, and rather full mention of books, pamphlets and articles. \$1.00 a year. Sample free.

It is a comprehensive analysis of a study by selected teachers over 6 weeks concerning

3,512 unselected pupils in 58 centers in up-state New York. It reveals deficiencies to be especially marked regarding habits of sleep, bathing and hand-washing, dental hygiene, balanced diet, over-fatigue.

Two reprints from Milbank Memorial Fund, 40 Wall St., New York, N. Y., copies free:

"A New Deal in Health Education," by Bertrand Brown.

"An Experiment In Health Education In Chinese Country Schools," by C. C. Chen, M.D.

Reprints and other pamphlets are offered by National Society for the Prevention of Blindness, 50 W. 50th St., New York, N. Y.:

"Activity Program in Sight-Saving Classes." 5 cents.

"Automatic Light Control in the Modern School." 5 cents.

"Eye Hazards in Play." 5 cents.

"First Eyeglasses at Middle Age." 5 cents.

"Light and Vision." 10 cents.

"Preventing Blindness Through Social Hygiene Cooperation." 10 cents.

"A Program of Eye Health in a School System." 10 cents.

"The Romance in the Movement for the Prevention of Blindness." 10 cents. "Great causes begin with great personalities"

"Safe and Sound." Syphilis blood test for expectant mothers.

"Trachoma in the United States." 10 cents.

"Vocational Guidance for Children with Defective Vision." 10 cents.

Single copies of the above free to health workers.

INFORMATION WANTED

American Social Hygiene Assn., 50 W. 50th St., New York, N. Y., would

like to receive from social hygiene societies, hospitals, clinics, or individual workers, any data available concerning education of patients while under treatment as regards their present condition and future health. A *Popular Health Instruction* number of the *Journal* is contemplated during the fall, for which such material will be especially useful.

BOOKS AND REPORTS

Death Rates by Occupation—By *Jessamine S. Whitney*. New York: *National Tuberculosis Association*, 1934. 32 pp. Price, \$1.00.

The almost complete lack of official occupational mortality rates by age and cause of death in the United States for any considerable number of occupations, has been a serious deficiency in our national vital statistics records. Industrial hygienists, vital statisticians, economists, labor officials, and others who have sought to determine and appraise the effects of occupations on health and longevity have suffered a handicap in mapping out campaigns for the amelioration of working conditions without this information.

In the introduction it is stated that up to this time no death rates by occupation have been available in the United States. While this is not strictly in accord with the facts, since death rates by occupation were published by the Bureau of the Census in connection with the 1890 and 1900 censuses, nothing has been published for over 30 years. These old data are probably inaccurate and certainly are not representative of present-day conditions. Mention might also have been made of the report of the Actuarial Society of America and the Association of Insurance Medical Directors entitled "Joint Occupation Study, 1928." Considerable light is thrown on the effects of occupational hazards by the death rates and ratios shown in that investigation.

The statistics published decennially by the Registrar General of England and Wales for more than 50 years have been the best guide to the effect on mortality of a large group of occupations. We

have not been able to do the same thing in the United States, mainly because of two considerations: (1) there is much greater shifting from job to job in the United States, and (2) there is greater accuracy in reporting the occupation at death in England and Wales. So many persons in the United States have been classified in general and unspecified occupational groups at death who were classified in specific groups in the census, that officials have felt that death rates for most occupations would not be valid.

As a result of an educational campaign of the editor and her coworkers, it was finally possible to select 10 states with data sufficiently accurate to compile occupational mortality figures. Thirty-nine per cent of all gainfully occupied men in the United States were found in these states which included part of the industrial East, the agrarian West, and one typical southern state. The general death rate for occupied males at specified ages in the 10 states corresponded closely with those for all males in the 10 states and in the U. S. Registration Area. The tabulations made by the Bureau of the Census were, of necessity, further limited to occupied males aged 15 to 64 in 1930, 53 occupation groups in which there occurred, in 1930, 500 or more deaths, and 17 specific causes of death.

To eliminate the influence of economic status, death rates are shown by age and cause, according to Dr. Alba Edwards' grouping of social-economic classes, with the exception that agricultural workers were grouped separately.

There are 8 tables and 1 chart. Standardized and age specific death

rates from 10 causes of death are shown for the social-economic classes and each of the 53 occupations. Table 1 presents a very valuable analysis of mortality by social-economic classes such as we have not had before, showing standardized and age specific death rates for all gainfully occupied males aged 15 to 64. It is rather unfortunate that the total for men in selected occupations is included in Tables 5, 7, and 8 as the basis for comparison for each occupation instead of the total of all gainfully occupied males. The net result is to give undue weighting to occupations with higher than average death rates and thus to raise the standardized death rate for all occupied males from 8.70 to 9.10. The standardized rates for each social and economic class and for each cause of death are also affected. This fact should be kept in mind when comparing death rates for a specific occupation with the general average.

The authors, who selected causes of death from the point of view of occupational hazard, included only 3 means of accidental injury. It is impossible, therefore, to tell what part total accidents played in the total mortality or in the mortality of the socio-economic or occupational classes.

A table giving the number of workers, deaths and death rates for most of the occupations in the Census Index of Occupations is included to show the necessity of selection for detailed study and to present significant figures for occupations excluded because the number of deaths was under 500. With the limitations of this table kept in mind, it will undoubtedly be of value. However, some measure of the position in the mortality scale, either through standardized death rates or ratios of actual to expected deaths might have been given for the larger occupations not included in the detailed study, especially where there was a high degree of correspond-

ence between the reporting on the census schedules and death certificates.

The comments of the authors on the tables are instructive but limited. Comments on the credibility of rates such as 910 for clerks (except those in stores), 772 for clerks in stores, and 693 for bookkeepers, cashiers, and accountants would have been helpful.

In spite of its inherent limitations, this report is a valuable addition to the all too meagre body of American statistics on occupational mortality. The data for social-economic classes are especially useful. Possibly the chief value of the work lies in the fact that it will keep alive interest in occupational mortality statistics in the United States and that it will serve as a groundwork for future studies. The difficulties which had to be overcome before this study could be accomplished were almost insurmountable. A debt of gratitude is owed to Miss Whitney "whose initiative, vision, and persistence made it possible." Acknowledgment is made in the report of the promotional work done by Miss Mary V. Dempsey and of the cordial coöperation and technical assistance of the staff of the U. S. Bureau of the Census.

ROBERT J. VANE

Hygiene for Freshmen—By Alfred Worcester, M.D. Springfield, Ill.: Charles C. Thomas, 1934. Price, \$1.50.

We have read this short book with pleasure and believe that it is constructed on the right principles, beginning with some anatomy and more physiology. The discussion of prevention of disease takes up only some 15 pages, and the subject of immunity 13 pages. The book begins with an introduction, following which biology and embryology are discussed. The next 8 chapters are devoted largely to physiological considerations, taking up in order

the circulation, glands, nutrition, digestion, etc. There is a glossary which strikes us as being insufficient for the average freshman. Each chapter is followed by questions which cover the contents.

It is doubtless bold for anyone to criticise the English of a Harvard professor. However, in some places the author changes abruptly from the impersonal to the personal, even in the same paragraph. Apparently the author forgot that he was writing a book and not delivering a lecture.

Altogether the book can be commended for the purpose for which it is intended. It is well printed and bound.

MAZÛCK P. RAVENEL

Text-Book of Meat Hygiene. With Special Consideration of Antemortem and Postmortem Inspection of Food-Producing Animals — By Richard Edelman, Ph.D. 6th Revised Edition, by John R. Mohler, V.M.D., and Adolph Eichhorn, D.V.S. Philadelphia: Lea and Febiger, 1933. 474 pp. Price, \$5.50.

A book which has gone through 6 editions has proved its value, and there is little or nothing to be criticised in the present volume. While it is dedicated to the veterinary profession, we wish very much that doctors, and especially health officers, would take more interest in this line of work, and absorb the sound scientific knowledge and advice contained in its pages. The editors have brought it up to the minute. It gives all improvements and changes in packing house methods and shipment, including the most recent knowledge concerning food poisoning and quick freezing.

Chapter IV is a reproduction of the regulations governing the meat inspection of the U. S. Department of Agriculture, including disposal of diseased carcasses, labeling, marketing, branding, reinspection, counterfeiting, exporting,

imported meat and products, and the handling and inspection of horse meat. An especially interesting chapter is the History of Meat Hygiene.

The book is a mine of information and can be recommended unreservedly to all interested in this most important branch of food hygiene. We wish for it a wide circulation.

MAZÛCK P. RAVENEL

Die Akuten Zivilisationsseuchen: Muesern, Pocken, Keuchhusten, Scharlach, Diphtherie, Epidemische Kinderlähme — Ihre Epidemiologie und Bekämpfung—By Dr. B. De Rudder. Leipzig: Georg Thieme, Verlag, 1934. 286 pp., 49 figs. Price, RM. 18 bd., RM. 16 unbound.

This treatise deals with the epidemiology and control of the acute diseases of civilization, namely measles, smallpox, whooping cough, scarlet fever, diphtheria, and epidemic infantile paralysis. The author is the director of the children's clinic in the University of Greifswald, and the book is written primarily from the clinical standpoint, but with emphasis on the relations of the subject to public health and state medicine. The book aims to present the basic facts of the epidemiology of these diseases in such a manner as to bring out the deficiencies in knowledge on the subject. Details of bacteriology and serology are omitted except in so far as they are related to therapy, control, or epidemiology.

The work is so very comprehensive in its scope that no brief review can adequately present it. For example, in dealing with infantile paralysis one finds, in addition to the many general topics concerned with the disease, discussions of the origins of centers of contagion, and of carriers, the contagiousness, the index of contagion and difficulties in determining it, variations in the period of incubation, family centers,

immunity and susceptibility, immunity without evidence of illness, extra-uterine origin of immunity, age distribution of immune individuals, the division of the population into groups of differing immunological relations, abortive attacks, periodicity influence of climatic factors, summer peak, and crippling effect.

Of especial value is the extensive survey of the principles of control and prevention by isolation, disinfection, quarantine, the carrier problem, vaccination, convalescent and adult serums, and standardization of serums and toxoids.

CHARLES A. KOFOID

Grundzüge der Hygiene—By Max Eugling. 3rd ed. Berlin und Wien: Urban & Schwarzenberg. 448 pp., 155 figs. in text. 1934. Price, M. 10 in paper, M. 11.80 bound.

The third edition of this comprehensive and informative handbook of hygiene has undergone a thorough revision of all sections with the addition of new material. The greatest expansion is in the subject of industrial hygiene, especially in industrial poisoning, a necessary consequence of the expansion of industrial chemistry. Sections on the control of communicable diseases, and the German and Austrian regulations on notification have been added. Many additions have been made to the sections on disinfection and infectious diseases. New statistics in social hygiene and new illustrations have been added.

Few, if any, books in this field have the breadth of vision, analytical display, lucidity of presentation, and inclusiveness which one finds in Professor Eugling's handbook. Teachers of the subject will find here a comprehensive and logical presentation of all aspects of hygiene. All those interested in public health will find here many suggestions in various fields which will widen the horizon of their interests and broaden the scope of their opportunities and obligations. CHARLES A. KOFOID

Seeing and Human Welfare—By Matthew Luckiesh. Baltimore: Williams & Wilkins, 1934. 190 pp. Price, \$2.50.

The point of view from which this book is written is that the human seeing machine should be supplied with a great deal more electric light than is ordinarily provided for it. The author undertakes to show why this is so and how the deficiency can be made up at small cost. He declares that millions of persons are being penalized every day for want of light, without knowing it, the result being a crippling of eyes, eye strain disorders, and an unnecessary expenditure of physical and nervous energy.

Seeing conditions, he says, are not necessarily adequate when the work can be done without conscious effort and with merely the required speed and accuracy. An adequate factor of safety should be provided. How large this should be or how it can be determined is not stated. Contrary to widespread belief, he says, it is hardly possible to have too much light.

Whereas an ideal condition is 1,000 foot-candles or the intensity existing in the shade of a tree a noon on a bright, sunny day, a great deal of the work of the world is done with an intensity of less than 1 foot-candle, or the light of a single candle at the distance of 1 foot. Three feet from a 100-watt tungsten filament lamp, the intensity of illumination is only about 10 foot-candles. These are called primitive conditions. The author recognizes that 1,000 candle power is more than can generally be provided in practice and would be satisfied with considerable smaller intensities, depending on the conditions under which the light would be used.

Intensities recommended by the author, without, however, stating any definite basis for them, follow. One hundred foot-candles or more for severe and prolonged tasks such as fine en-

graving; 50 or more for drafting, watch repairing and difficult reading; 20 to 50 for prolonged clerical work, reading, and bench work; 10 to 20 for office and factory work; 5 to 10 where fine details are not involved.

The low cost of current makes adequate lighting practicable so far as current is concerned, for it averages about 6 cents per kilowatt for residences and is sometimes less than that. At this rate, a 50 watt lamp has to burn 4 hours to cost 1 cent. The author says: "One can enjoy 100 foot-candles for reading an entire evening or for a large part of a day at the cost of a telephone call." The cost of installations, fixtures, lamps, and replacements are not mentioned, but often present a serious obstacle to proper lighting.

A reading of the book would convey a profound sense of the involved character of seeing, if anyone had any doubt about the matter. And it is but fair to say that the author attempts to deal with only a part of the broad topic he has chosen. He says that the science of seeing must deal with three major complexities which are interdependent and intermingled:

1. The external world of physical factors.
2. The eyes, visual sense and successive events of visual response.
3. The psycho-physiological effects pertaining to human behavior, efficiency, welfare and happiness.

The book has to do chiefly with the first of these complexities.

So far as public health workers are concerned, the principal use of the book lies in the simple way in which terms, facts, and arguments used by lighting experts are explained.

The author is director of the Lighting Research Laboratory of the General Electric Company, Cleveland. He has written over a dozen other books on subjects pertaining to light, and particularly artificial light.

GEORGE A. SOPER

Notes on Planning a Publicity Program—By *Mary Swain Routzahn*. New York: Social Work Publicity Council.

Social workers and publicity committee members looking for guide-posts to show them the way to plan a publicity program or to check over plans already afoot will find many suggestions in *Notes on Planning a Publicity Program*, just published. Mrs. Routzahn is Consultant in Social Work Interpretation of the Russell Sage Foundation.

In an informal way, Mrs. Routzahn brings up leading points for consideration in planning a program: the reasons for year-round programs; what publics the program tries to reach; what to tell; the forms in which information is available; and various publicity channels evaluated in relation to the public.

The pamphlet can be secured from the Social Work Publicity Council, 130 E. 22nd Street, New York, N. Y., for 15 cents per copy.

BOOKS RECEIVED

BENJAMIN RUSH. PHYSICIAN AND CITIZEN. By Nathan G. Goodman. Philadelphia. University of Pennsylvania Press, 1934. 421 pp. Price, \$4.00.

EXERCISE WITHOUT EXERCISES. By S. Arthur Devan. New York: Dodd, Mead, 1934. 84 pp. Price, \$1.25.

THE ART AND PRINCIPLES OF NURSING. By Amy Elizabeth Pope and Virna M. Young. New York: Putnam, 1934. 832 pp. Price, \$2.75.

MENTAL HYGIENE AND EDUCATION. By Mandel Sherman. New York: Longmans, 1934. 295 pp. Price, \$2.25.

- THE MOTHER'S ENCYCLOPEDIA.** Compiled and Edited by the Editors of The Parents Magazine. New York: Reynal & Hitchcock, 1933. 959 pp. Price, \$3.00.
- MICROBIOLOGY AND ELEMENTARY PATHOLOGY.** For the Use of Nurses. 2d ed. By Charles G. Sinclair. Philadelphia: Davis, 1934. 377 pp. Price, \$2.75.
- THE CHILD. HIS ORIGIN, DEVELOPMENT AND CARE.** By Florence Brown Sherbon. New York: McGraw-Hill, 1934. 707 pp. Price, \$3.50.
- CURRENT PROBLEMS IN CAMP LEADERSHIP.** A Workbook for Camp Counselors and Directors. Edited by Jackson R. Sharman, Marjorie Hillas and David K. Brace. Ann Arbor: Ann Arbor Press, 1934. 120 pp. Price, \$1.25.
- YOUR CHILD IS NORMAL.** The Psychology of Young Childhood. By Grace Adams. New York: Covici Friede, 1934. 241 pp. Price, \$2.00.
- CHILD LABOR.** Bulletin of the Russell Sage Foundation Library. New York: Russell Sage Foundation, 1934. 4 pp. Price, 10¢ a copy. 50¢ a year.
- THE FAMILY.** By M. F. Nimkoff. New York: Houghton Mifflin, 1934. 526 pp. Price, \$3.00.
- HUMAN NATURE.** A Guide to Its Understanding. By Judson Rea Butler. New York: Greenberg, 1933. 174 pp. Price, \$2.00.
- PRACTICAL EVERYDAY CHEMISTRY.** By H. Bennett. New York: Chemical Publishing Co., 1934. 305 pp. Price, \$2.00.
- THE HOUSING PROGRAM OF THE CITY OF VIENNA.** By Charles O. Hardy and Robert R. Kuczynski. Washington: The Brookings Institution, 1934. 142 pp. Price, \$2.00.
- WISH-HUNTING IN THE UNCONSCIOUS.** An Analysis of Psychoanalysis. By Milton Harrington. New York: Macmillan, 1934. 189 pp. Price, \$2.50.
- RECENT ADVANCES IN ALLERGY.** 2nd ed. By George W. Bray. Philadelphia: Blakiston, 1934. 503 pp. Price, \$5.00.
- NATURE'S WAY.** By Victor C. Pedersen. New York: Putnam, 1934. 81 pp. Price, \$1.00.
- NURSING SCHOOLS—TODAY AND TOMORROW.** Final Report of the Committee on the Grading of Nursing Schools. New York: Committee on the Grading of Nursing Schools, 1934. 268 pp. Price, \$2.00.
- AN ACTIVITY ANALYSIS OF NURSING.** By Ethel Johns and Blanche Pferferkorn. New York: Committee on the Grading of Nursing Schools, 1934. 214 pp. Price, \$2.00.
- TUBERCULOSIS OF THE LYMPHATIC SYSTEM.** By Richard H. Miller. New York: Macmillan, 1934. 248 pp. Price, \$4.00.
- GERMICIDAL VALUE OF PURE SOAP.** By F. A. Diasio, B.A., M.D. Reprinted from *Medical Review of Reviews*, August, 1934. 16 pp. Free distribution by Procter & Gamble Company, New York, N. Y.

A SELECTED PUBLIC HEALTH BIBLIOGRAPHY WITH ANNOTATIONS

RAYMOND S. PATTERSON, PH.D.

John Bull's Children—The growth of the preventive aspects of school medical service in England is recounted. There the school child health supervision is much more closely allied to the other services which make up the general program of health improvement than is at present possible in this country.

ANDEN, G. A. School Medical Inspection in England. *Child H. Bull.* 10, 5:149 (Sept.), 1934.

Comparative Mortality—Industrial workers have mortality rates greatly in excess of those higher in the economic

scale; unskilled workers have the highest. Tuberculosis, pneumonia, and accidents are chiefly the cause. In England the difference is even more marked than here.

BRITTEN, R. H. Mortality Rates by Occupational Class. *Pub. Health Rep.* 49, 38:1101 (Sept. 21), 1934.

British Care of the Tuberculous—Early diagnosis and after-care of tuberculosis are the problems in Great Britain as they are here. Hence, what is being done there is of interest to us, too.

BURTON-FANNING, F. W. Our Difficulties in

the Conflict Against Tuberculosis. *J. State Med.* 42, 9:497 (Sept.), 1934.

Do People Die of the Heat?—Exceptionally high death rates appear to be associated with exceptionally high temperatures in a study made of conditions during the recent middle western drought.

COLLINS, S. D. Maximum Temperatures and Increased Death Rates in the Drought Area. *Pub. Health Rep.* 49, 35:1015 (Aug. 31), 1934.

Mottled Enamel of Teeth—Infinite amounts of sodium fluoride in drinking water—25 p.p.m.—produce changes in the teeth of rats, an indication of how small a dosage will injure teeth of humans as well.

DEAN, H. T., *et al.* Effect of Various Amounts of Sodium Fluoride on the Teeth of White Rats. *Pub. Health Rep.* 49, 37:1075 (Sept. 14), 1934.

When Budgets Are Cut—Intended to serve a local situation, the consideration of essential health administrative measures broadens out to make a most valuable and generally useful document.

EMERSON, K. Essential Public Health Services. *New Eng. J. Med.* 211, 10:451 (Sept. 6), 1934.

Something New Under the Sun—Sonne dysentery is endemic, of increasing incidence, and may change in epidemic form to affect more adults than in the present stage (in which it is confined largely to children).

FILSEN, J., and OSOFSKY, A. G. Sonne Dysentery. *J.A.M.A.* 103, 13:966 (Sept. 29), 1934.

When Youngsters Whoop—Vaccination with pertussis antigen reduced the severity of the whooping cough attacks, as compared with a control group, among children who contracted the disease after exposure.

FRAWLEY, J. M. The Immunization of School Children Against Whooping Cough. *J.A.M.A.* 103, 13:960 (Sept. 29), 1934.

More Praise for Breast Feeding—Among 20,000 babies cared for by the Chicago Infant Welfare Society, the morbidity rate of the artificially fed was nearly double the sickness rate of the breast-fed children, and the mortality rate ten times greater. Breast feeding is still the most potent protection against diseases of infancy.

GRULLEE, C. G. Breast and Artificial Feeding. *J.A.M.A.* 103, 10:735 (Sept. 8), 1934.

School Nursing Good and Bad—Information about the performance of school nurses is set forth in the survey by the N.O.P.H.N. There is much worth while discussion of the conditions and problems revealed.

HELBERT, H. Public Health Nursing Service to School Children. *Pub. Health Nurs.* 26, 9:461 (Sept.), 1934.

Rheumatic Children—Tonsillitis or sore throat was the preceding infection in 60 per cent of the 1,200 rheumatic children studied; and respiratory infections are an important factor in recrudescences of rheumatic phenomena.

KAISER, A. D. Factors that Influence Rheumatic Disease in Children. *J.A.M.A.* 103, 12:886 (Sept. 22), 1934.

Do We Need Cancer Propaganda—Urging the need for better medical preparation for early diagnosis of cancer, the author minimizes the need for more lay education with the opinion that probably there are few individuals over twenty-one who have not heard about cancer.

MACCARTHY, W. C. The Cancer Problem Today. *J.A.M.A.* 103, 13:957 (Sept. 29), 1934.

Praise for Raw Milk—Copious evidence, almost amounting to proof, is at hand that raw milk taken by children and growing boys and girls acts as a preventive of dental caries: pasteurization of milk reduces its nutritive value; small doses of bovine tubercle bacilli protect against human type infection;

undulant fever from cows is uncommon anyway; streptococcic mastiditis has never been proved pathogenic to man; the cow is becoming too civilized an animal. These are the suggestions set forth by the Director of Dental Studies of the London Hospital.

SPAUSEN, E. Raw Milk and Sound Teeth. *Pub. Health*, 47, 12:388 (Sept.), 1934.

Dental Hygiene and Health—Providing free dental care for 9,400 poor children in New York, emphasizing preventive features, and training a large group of dental hygienists is the impressive record of the Guggenheim clinic for last year.

MCCALL, J. O. Dental Care as a Health Measure. *Child H. Bull.* 10, 5:158 (Sept.), 1934.

Strengthening Weak Spots in Nursing—How federal and state health authorities may contribute to improving the public health nursing services concludes this interesting discussion of the findings of a recent survey of public health nursing.

McIVER, P. Some Findings of the N.O.P.H.N. Survey of Public Health Nursing of Significance to State Health Administrators. *Pub. Health Rep.* 49, 37:1031 (Sept. 14), 1934.

Tests for Dangerous Dusts—Another paper revealing that the response of the peritoneal tissue to various dusts can be used as a test to determine the possible harmfulness of an industrial dust.

MILLER, J. W., *et al.* Response of Peritoneal Tissue to Dusts Introduced as Foreign Bodies. *J.A.M.A.* 103, 12:907 (Sept. 22), 1934.

Encephalitis Virus Transmitted Experimentally—Virus from the brain substance of persons dying during the St. Louis encephalitis outbreak can be carried through white mice; it is neutralized by convalescent serum but not by normal serum or convalescents from Japanese or Australian varieties of this disease.

MUCKENRUS, R. S., *et al.* Etiology of the 1933 Epidemic of Encephalitis. *J.A.M.A.* 103, 10:731 (Sept. 8), 1934.

Of Interest to Health Department Laboratories—Described in detail and well illustrated is the laboratory equipment developed in an attempt to improve existing sanitary engineering laboratories.

REDDICK, T. M. Some Developments in Sanitary Engineering Laboratory Equipment at New York University. *J. Am. W. W. Assn.* 26, 9:1238 (Sept.), 1934.

Child Hygiene Program Weaknesses—Current child health projects are scrutinized and the weaknesses are pointed out. The conclusion is that child hygiene is not an entity. State health departments should provide leadership in maternal and child health as a part of a whole community health promotion program.

WARNER, E. F. Child Health Activities in a State Department of Health. *Pub. Health Rep.* 49, 36:1056 (Sept. 7), 1934.

ASSOCIATION NEWS

SCIENTIFIC EXHIBITS IN PASADENA

THE best Scientific Exhibits which have ever been sponsored by the American Public Health Association were shown in the Exhibition Hall of the Civic Auditorium during the period of the 63rd Annual Meeting in Pasadena. Eighteen organizations participated, covering 3,000 square feet of space with exhibits of their valuable contributions to public health, ranging from the simplest of gadgets to make easier the work of the health department personnel, to the extensive exhibit imported from the Dresden Museum of Hygiene in Germany especially for this meeting.

There was also included in this exhibit Mr. Routzahn's well known education and publicity display. This needs no introduction or description for it has been an indispensable part of Association meetings in the past. Delegates never fail to attend it, and its popularity is, without doubt, well deserved.

The exhibit from the Dresden Museum of Hygiene dealt primarily with the subject of Eugenics. Although the subject matter was interesting, the exhibit was important principally as a demonstration of methods of presentation which have been developed to such a high degree by the Museum through many years of study. Pictures and models were used extensively. Printed material was conspicuous by its absence, the briefest of titles being used to explain the subject matter so adequately depicted in the photographs and models. A number of valuable suggestions in effective exhibit methods

were offered to those particularly interested in health education.

The delegates manifested great interest in the exhibit. It is planned to display this material in several cities throughout the country, which will give an additional number of health workers an opportunity to study it.

The gadget exhibit comprised contributions from several health departments, including the city and county of Charleston, S. C., the New York City Health Department, Buffalo Health Department, and the Los Angeles County Health Department. The exhibit was comprised chiefly of simple devices which have originated in the administrative offices or laboratories of these health departments and have been found useful and helpful in expediting their work. Typical examples of these gadgets are a convenient rack for baskets of test tubes, an inexpensive animal board, and a deep water sampling outfit. These gadgets were suggestive for the creation of many other similar devices to those who viewed them.

The exhibit of the City of Pasadena covered several phases of their work and included a three dimension model of the Morris Dam with a continuous flow of water over the spillway, pictures showing details of the activated sludge plant and the processing of fertilizer manufacture, an illuminated series illustrating the work of the Tumor Clinic, and a presentation of Pasadena's poliomyelitis control in 1934.

The California Tuberculosis Association included in its display an illumi-

nated frame showing X-ray pictures and a neon chart entered by the California Medical Association illustrating the reduction in the death rate from tuberculosis since 1906.

California was further represented in the exhibit by contributions from the State Board of Health, the George Williams Hooper Foundation, the Los Angeles County Health Department, and the Los Angeles City Health Department.

The State Board of Health included pictures and graphs showing the historical development of the Board, also plague demonstration material, demonstration of biologics prepared by the State Hygienic Laboratory, and a graph showing the history of plague in California.

The George Williams Hooper Foundation of the University of California had a graphic display of the epidemiology of brucella infections, relapsing fever, psittacosis, and rickettsia infections.

The Los Angeles County Health Department, the most unique county department in the United States, portrayed its work through a selected series of charts and photographs emphasizing particularly their health centers, medical social service, dental hygiene, and communicable disease control activities.

The Los Angeles City Health Department had a very realistic exhibit from its rodent control division showing the application of ratguards to ship mooring lines at the harbor, and demonstrating the impossibility for a rat to make its way to the dock. It included, also, a demonstration of the Palm Tree Rat Exterminating Truck. Rat extermination in palm trees being a problem unique in Southern California since, contrary to popular belief, the palm tree affords an almost perfect harborage for rats.

The ground squirrel poisoning method—by means of poisoned grain and car-

bon bisulphide gas—was demonstrated by constructing in detail a section typical of squirrel infested territory both the surface and the ground below, with material and equipment in action.

The Bureau of Housing and Sanitation, Milk Division, and Fruit and Vegetable Division were represented by various pictures, charts, and models of their work. Among the latter were two outstanding educational models; one—"The Perfect Restaurant"—a miniature of a restaurant showing all building features, fixtures, kitchen, dining room, and toilet arrangement as required by the city ordinances. The other—"A Model Refrigerator Car"—a perfect replica of the well known orange colored "Freaser Cars" employed in transporting fruit and vegetable products under ice or special ventilation.

The Medical Section of this Los Angeles City Exhibit included a model of a classroom of the Post Graduate Nurses' course in obstetrical procedure from the Nursing Division, a model of a Neo Salvarsan Clinic for the treatment of syphilis from the Women's Venereal Division, a bacteriologic laboratory exhibit of the poisonous "Black Widow" and common garden spiders, and an exhibit of charts from the Epidemiological and Quarantine Sections illustrating the behavior of the 52 diseases "Reportable" under the law of California.

In addition, wall maps and charts of the organization, were on display.

The Scientific Exhibits included two others of particular interest; one, on eugenic sterilization, summarizing a study of the 10,000 patients who have been sterilized in California during the past 25 years. The other, by the U. S. Public Health Service, illustrating by means of photographic transparencies the developmental cycle concerned in the application of mosquito salivary glands in malaria therapy. This method is designed to replace the transfusion of

blood and the use of live mosquitoes in the treatment of paresis. Used as a culture, the extracted glands have been kept alive for 21 days.

In addition to the inside exhibits, two motor units were shown on the plaza immediately adjacent to the Exhibition Hall. The Santa Barbara mobile dental unit is an automobile trailer with full dental equipment, including compressed gas for heating and sterilizing instruments, running water, and electric power from storage batteries. This is used for teaching and demonstrating hygiene of the mouth as practised in the schools of remote and mountainous districts. The second motor unit was the mobile squirrel dissection laboratory of the State Health Department.

Demonstrations of squirrel dissection were given daily and proved of great interest to many visitors.

The success of the Scientific Exhibits was in a considerable measure due to the splendid work of the Pasadena Committee and particular credit goes to Mr. Charles W. Arthur, Pasadena Health Department for his devoted and capable service in managing the exhibit and directing its installation.

The 64th Annual Meeting is looming ahead and the Committee on Scientific Exhibits is already looking forward to another Scientific Exhibit, at least comparable, if not better than that at Pasadena.

HOMER N. CALVER, *Chairman*
Committee on Scientific Exhibits

BROADCASTING AT A.P.H.A. MEETINGS

SEVERAL years ago it was decided to make use of the radio at our Annual Meetings for the broadcast of public health information. The matter was arranged by Dr. F. O. Tonney, Radio Adviser to the President's Committee on Radio of the A.P.H.A. At the recent meeting in Pasadena, 23 radio speakers were engaged, the names of which appear in our program of the meeting. There were 23 broadcasts made, of which 20 were over the Don Lee Broadcasting System on the Pacific Coast, with 13 to 16 stations reaching as far to the East as Denver. Three of them were on a National network of 50 stations, covering the central and eastern states. Dr. Tonney reports that many responses from the audience are coming in.

SOUTHERN BRANCH ANNUAL MEETING

THE Third Annual Meeting of the Southern Branch of the American Public Health Association will take place in San Antonio, Texas, on November 13 and 14, in conjunction with the Southern Medical Association,

which meets from November 13 to 16.

An excellent program of two morning sessions and two afternoon sessions has been arranged. Some of the subjects to be presented are: The Objectives and Possibilities of the Public Health Movement in the South, by A. T. McCormack, M.D.; Tuberculosis Control, by I. C. Riggan, M.D.; Tennessee Valley Authority, by E. L. Bishop, M.D.; Newer Approaches in Health Education, by Henry F. Vaughan, Dr.P.H.; The Use of the Untrained Nurse in Emergency Public Health Work, by Pearl McIver, R.N.; CWA-ERA Malaria Control Program in the South, by L. L. Williams, Jr., M.D.; Recent Sanitary Improvement Projects with Public Funds, by V. M. Ehlers, C.E.; Depression Effects on Typhoid Epidemics, by J. N. Baker, M.D.; The Efficacy of Typhoid Prophylaxis in the United States Army, by Robert U. Patterson, M.D.; The Efficacy of Typhoid Prophylaxis in the United States Navy, by S. S. Cook, M.D.; Some of the Public Health Problems in Texas and How They Are Being Met, by John W. Brown, M.D.; Diph-

theria Immunization, by A. H. Flickwir, M.D.; and The Prevailing Reduction in Public Health Budgets in Texas and What Is to Be Done About It, by J. W. Bass, M.D.

All southern health workers interested

in public health progress are invited to attend the meeting and participate in the discussions. For further information write to Dr. G. Foard McGinnes, Secretary, Southern Branch, State Department of Health, Richmond, Va.

APPLICANTS FOR MEMBERSHIP

The following individuals have applied for membership in the Association. They have requested affiliation with the sections indicated.

Health Officers Section

Monroe F. Brown, M.D., Phm.D., Fayetteville, Tenn., Director, Lincoln Health Dept.
William R. Dorr, M.D., Arlington, Calif., Superintendent, Riverside County Hospital
Gordon Hastings, M.D., State Board of Health, Little Rock, Ark., Assistant State Health Officer
Thaddeus C. Kimble, M.D., Ph.D., Miltonvale, Kans., City Health Officer
William P. Lee, Huey Bldg., Cisco, Tex., City Health Officer
Aaron Leifer, M.D., 340 St. Johns Place, Brooklyn, N. Y., Medical Inspector, New York City Dept. of Health
Edward G. McGavran, M.D., Hillsdale, Mich., Director, Hillsdale County Health Dept.
Claud L. Murphree, M.D., Court House, Gadsden, Ala., Etowah County Health Officer
W. H. Smith, Box 216, Hondo, Tex., Medina County Health Officer
Samuel D. Sturkie, M.D., Oneonta, Ala., Blount County Health Officer

Laboratory Section

Kenneth L. Burdon, Ph.D., Washington University School of Medicine, St. Louis, Mo., Instructor in Bacteriology, Immunology, and Public Health

Public Health Engineering Section

Joe C. Behrens, B.S., 4300 Maypole Ave., Chicago, Ill., Sanitary Engineer, City Board of Health
John A. Clark, A.B., 141 Belleview Drive, San Leandro, Calif., Sanitary Engineering Inspector
Eugene F. Schad, B.S., 1046 N. Kedzie Ave., Chicago, Ill., Junior Assistant Sanitary Engineer

Public Health Nursing Section

Alice Austin, R.N., 681 Merrick, Detroit, Mich., Supervisor of Public Health Nurses
Frances A. Barringer, R.N., Court House, Charlotte, Va., County Health Nurse

Martha E. Booher, R.N., 820 Florida Ave., Blountsville, Tenn., Staff Nurse, Sullivan County Health Dept.

Claudia Davidson, R.N., 2902 Belmont Blvd., Nashville, Tenn., Field Nurse

Hazel Fees, Jamestown, Tenn., County Health Nurse

Jean E. Greer, R.N., 3317 White Bldg., Seattle, Wash., Director, Seattle Visiting Nurse Service

Ethel R. Jacobs, Albion, Ind., Noble County Public Health Nurse

Mrs. Pearl L. Maier, R.N., C.P.H., Gladwin, Mich., Public Health Nurse, Children's Fund of Michigan

Evelyn E. Morgan, R.N., Pike County Health Dept., McComb, Miss., Staff Nurse

Anne Pelley, R.N., Batesville, Ark., County Health Nurse

Industrial Hygiene Section

Leroy P. Kuhn, M.D., 4750 Sheridan Rd., Chicago, Ill. (Assoc.)

Food and Nutrition Section

Frederick B. Carter, El Monte, Calif., Manager, Arden Farms, Inc. (Assoc.)

Public Health Education Section

Thomas B. Kirkpatrick, M.A., University Hall, Columbia Univ., New York, N. Y., Teaching Community Hygiene

Epidemiology Section

John S. Cunningham, M.D., La Plata, Md., Deputy State and County Health Officer

Dale McCoy, D.O., Burlington, Kans., Coffey County Health Officer

Katherine A. Nye, M.D., 803 Lowry Medical Arts Bldg., St. Paul, Minn., Medical Inspector, Dept. of Health

Request for Change in Status

Maria W. Bates, 112 Linden Ave., Malden, Mass., formerly Associate Member, is now Health Teacher, Beebe Junior High School, Malden, Mass.

PASADENA SPECIAL

"ALL aboard!" At 9.15 on the evening of August 28, many fortunate members of the A.P.H.A. heard that call. It started the A.P.H.A. Special Train to the Pasadena meeting. Three sleepers left Grand Central Station on one of the most interesting itineraries many of the passengers have ever taken.

To all those aboard the same ideas probably came: Who is taking the trip? In what car are my friends? I wonder whether someone would like to play bridge? These questions were soon answered, and before the train reached Harmon, N. Y., groups had assembled to talk and to discuss matters important to them.

Early in the morning the train reached Buffalo. Some energetic spirits arose to see the station, but their number was not legion. At breakfast one of the most convenient of all arrangements made itself evident—All you had to do to get a delightful meal was to give up one of your tickets in the scrip book turned over to you with your ticket. Why, you could almost imagine that you were receiving a free meal! And, further, you were not troubled with any tipping. All those incidentals were included in the ticket. This scheme has great appeal to anyone who has traveled considerably. It surrounds you with the atmosphere of a private train.

About noon more members joined the Special at Detroit. These were greeted by friends and promptly initiated into the "family."

By now the travelers had settled down. Here you could see one of the Association officers working on a paper; in another section committee members were studying the year's work. These activities were noticed on the entire trip to Pasadena in spite of the scenery passed enroute and the enter-

tainment provided at stops. This speaks well for the diligence of many of our officers and members.

Arriving in Chicago about 5.30 p.m., we were met by Dr. Herman N. Bundesen and some of his staff. In taxicabs the entire party was promptly taken to the Century of Progress Exposition where, in Old Heidelberg, a satisfying dinner was served. This meal was made quite enjoyable by the music—vocal and instrumental—of the costume clad German singers. After dinner, one's time was his own until train departure at 1.00 a.m. Some of the party enjoyed the view from the Sky Ride; others went to see the fine displays of the automobile manufacturers; while it is said that many spent the entire evening in the Streets of Paris.

Leaving Chicago, our Special Train was complete with five sleepers, a diner, a club car, and an observation car. From this point on the train belonged to the A.P.H.A. There were now no "furriners" aboard, and the train officials made it clear that the party was to enjoy itself in the full freedom of the train. (It was reported that two of the party were in the engine when the train was standing at a station.)

From Chicago to the Mississippi River all slept, but bright and early that morning (Thursday) some witnessed the river crossing. At noon we were in Kansas City where a stop of 45 minutes afforded opportunity to see the beautiful station and the impressive war memorial across the plaza from the station.

Leaving Kansas City the route followed the old Santa Fe Trail, passing Newton, Kans., about 7.00 p.m., and Dodge City at bedtime. Early Friday morning the mountains started to fly by the windows. Early risers were well

rewarded by seeing the summit of Raton Range at Raton, N. M., a point 7,622 feet above sea level. About noon the train reached the Pueblo Indian village country. The villages, peculiar to these Indians, were intensely interesting.

At Albuquerque, the party had ample time to visit Fred Harvey's Museum and to rave over the interesting objects he has collected. The beaten silver jewelry with turquoise ornamentation was especially attractive to the ladies, and evidences of some purchases were seen on fingers and wrists after the train left.

On to Gallup! Here took place one of the events of the trip which made a lasting impression on all. The 12th Intertribal Ceremonies were being held and the A.P.H.A. party was privileged to see the last night of it. Many tribes took part, exhibiting such tribal dances as the Eagle Dance, the Crow Dance, and the Fire Dance. What a thrilling episode in the life of those unaccustomed to such exhibitions! The Indian audience watching the dances was just as intriguing as the dancers themselves.

Grand Canyon all day Saturday! This was another of the high spots of the trip. Adequate description is impossible—one must see it. A westward drive to Hermit's Rest occupied the morning. In the afternoon some took the trip to Indian Watch Tower which is to the east along the south rim. This is a beautiful drive and the Watch Tower one of the loveliest pieces of design and construction typifying the Pueblo Indian to be found anywhere. Five members of the party were hardy enough to descend the canyon to the river on muleback. Their tales of "heroism" after returning indicated an enjoyable trip. The Mojave Desert was crossed on Sunday morning. At San Bernardino the party was welcomed with customary California hospitality. A Spanish orchestra was playing at the

station; oranges were offered to quench one's thirst; and officials of the city and the Chamber of Commerce greeted the travelers personally.

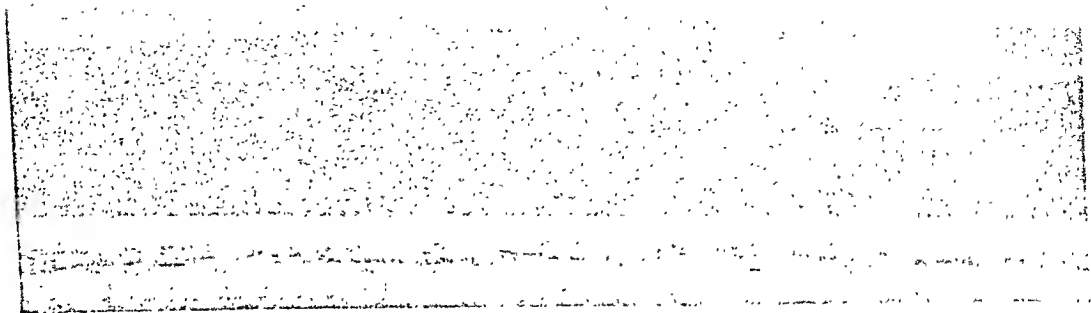
After the cordial greeting at San Bernardino, the Special slipped into Pasadena, where the Local Committee, headed by Dr. Dunshee, welcomed the group of more than 100 and saw to it that each was happily settled for the busy convention ahead.

After the Annual Meeting—a busy and successful one—all were loath to leave. But, after all, the Special did have to depart on schedule and, except for a small party which was able to go to Yosemite National Park through the courtesy of some of the California State Department of Health officials, all were on board Thursday at departure time.

Would the return trip be an interesting one?—This thought occurred to many as they boarded the train. It was needless. The return trip, somewhat like Grand Canyon, cannot be adequately detailed or described. At San Francisco Dr. Geiger was a delightful host; at Stockton and Lodi, Dr. Sippy justified his reputation for entertaining; and at Sacramento Dr. True displayed the true California spirit of hospitality. In all of these four interesting areas instructive and entertaining programs requiring the constant attention of the entire party had been planned and were executed with precision and with pleasure to the participants.

It was only with regrets that the members of the party left California. All of the western members as well as the associations affiliated with the parent organization, fully justified the expectations of the "swell" time forecast for the meeting.

Sunday, after leaving Sacramento, was replete with scenery. Here the mountains, snow-capped because of a recent snowfall; there the flat country and the famous Salt Lake, over which the train travelled for miles. The con-



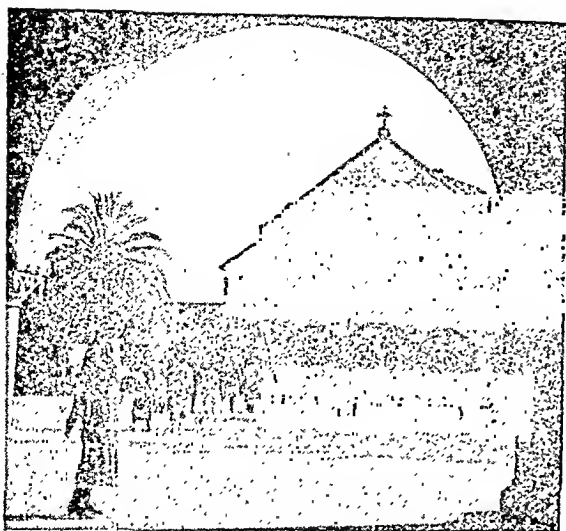
Rockies from the Train, Colorado



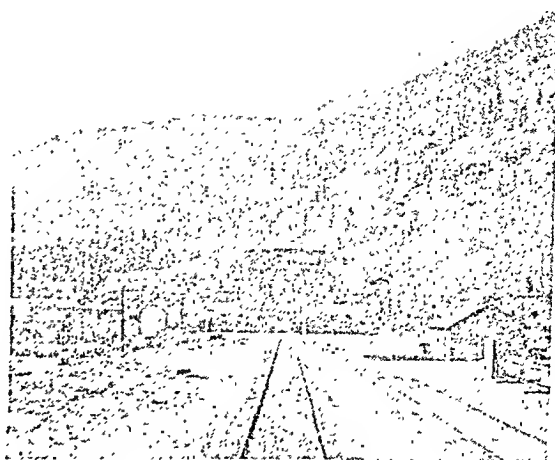
Hassler Home, San Francisco



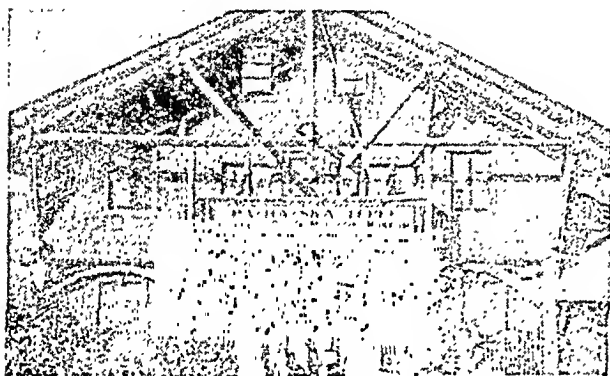
The Tour Conductors



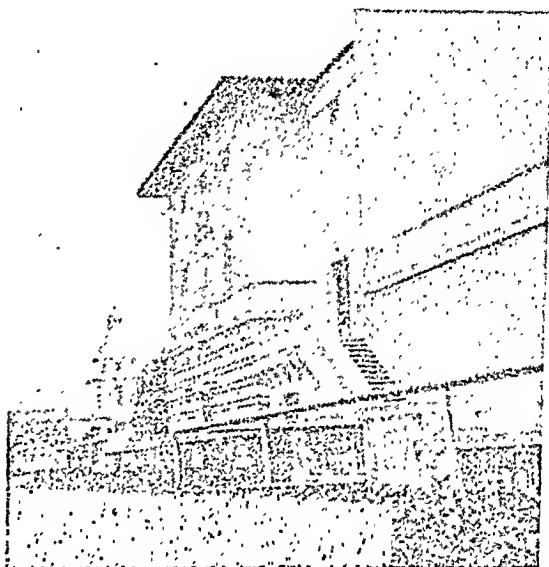
Leland Stanford Memorial Chapel



Moffat Tunnel—Near Denver



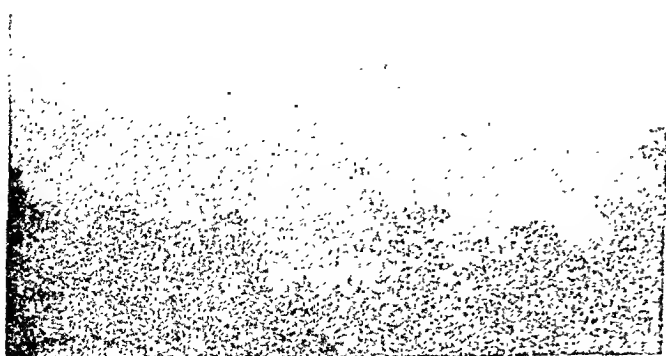
Lookout Point—Near Denver



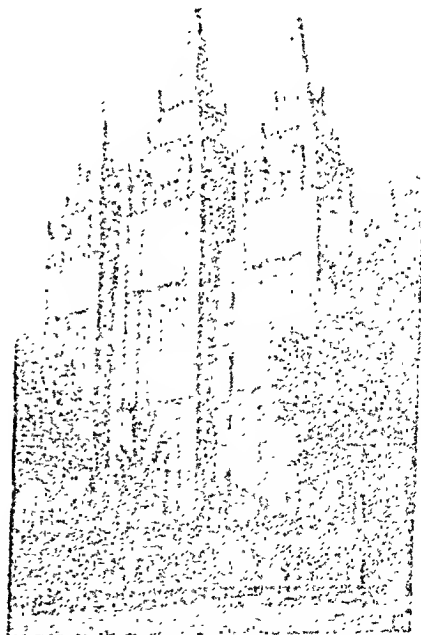
Pasadena Convention Hall, City Auditorium



Troubadours of Welcome, San Bernardino



Golden Gate



Salt Lake Cathedral

trast of mountains, flats, and blue water is such as to leave a vivid impression on one's memory.

At Salt Lake City, Dr. Beatty met the Special. A well planned stop-over included a tour of this lovely city situated in the bottom of a natural bowl, a visit to the Tabernacle of the Latter Day Saints, where a special organ recital was given and a dinner under the auspices of the Chamber of Commerce. The thoughts of the individual members of the party will always deal kindly with Salt Lake City, and the gracious residents of that city.

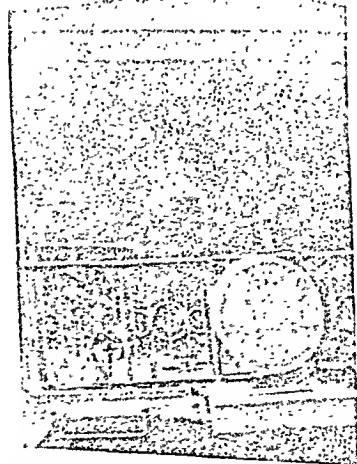
From Salt Lake City to Denver the route displayed some of the most spectacular scenery in America. The Fraser River Canyon, along the Colorado River, up into and through the Moffat Tunnel—all these produced wonderful and characteristic views long to be remembered. Obviously this lovely scenery could not go on interminably. The Special arrived in Denver early Monday afternoon, where Dr. Jaffa and Dr. Beaghler greeted the travelers, promptly arranged for their

comfortable transportation to Lookout Mountain, and engineered the last lovely tour of the trip. From the consecrated spot hallowed by the grave of Buffalo Bill, an inspiring view of Golden and of Denver, far in the background, was had. From this vantage point the group twisted and turned down the Lariat Trail, back to Denver and a most welcome and enjoyable dinner.

Knowing that Denver was the last stop-over of the Special Train, the footsteps of the passengers seemed to lag on the way through the station. But after kindly farewells and promises to return, the train moved out, seeking New York, its destination. From Denver to New York was uneventful except for the conversations of the Special party in which the pleasures of the entire trip were discussed and rehearsed from person to person.

All good things must end, and New York saw the close of one of the pleasantest and best planned trips in the Association's history.

"Here Porter, please take my bags."
A. P. M.



All the photographs reproduced here were very kindly supplied by members of the party who snapped them during the trip

NEWS FROM THE FIELD

DELEGATES TO ARGENTINA CONFERENCE

KENDALL EMERSON, M.D., Life Member and Executive Secretary of the A.P.H.A., and Managing Director of the National Tuberculosis Association, will be one of the delegates representing the United States at the Pan-American Sanitary Conference in Buenos Aires, Argentina, November 12-22.

Surgeon-General Hugh S. Cumming, F.A.P.H.A., and B. J. Lloyd, M.D., member A.P.H.A., of the U. S. Public Health Service, will be the other delegates, Dr. Cumming acting as chairman of the delegation. They sailed from New York on October 13.

NATIONAL ADVISORY COUNCIL ON RADIO IN EDUCATION ENTERS PUBLIC HEALTH FIELD

THERE will be 19 programs of 15 minutes each (10:45-11:00 Eastern Standard Time) every Monday evening, from October 2 through February 25—excepting October 27, November 5, and November 12—over a nation-wide network of the Columbia Broadcasting System.

This series of broadcasts will consider the subject of medical economics, the cost of medical care, the relation between the medical profession and the public, and ways of reconciling the interests of the two groups.

All the programs will be published by the University of Chicago Press, 5750 Ellis Avenue, Chicago, and each program will be available shortly after it is broadcast, for \$.15 for individual numbers, or \$2 for the series of 19.

The Public Health Committee of the National Advisory Council on Radio in Education is headed by William Trufant Foster, Director of the Pollak Founda-

tion, and includes Dr. Haven Emerson, Dr. Alice Hamilton, Dr. Thomas Parran, Jr., Dr. H. S. Cumming, and Dr. Ray Lyman Wilbur. The National Advisory Council on Radio in Education is headed by Robert A. Millikan as President, and Levering Tyson is the Director.

JANUARY 1933 JOURNALS WANTED

READERS of The American Journal of Public Health are asked to send spare copies of the January, 1933, issue to the American Public Health Association, 50 West 50th Street, New York, N. Y., as this issue is out of stock. This will be much appreciated, and reimbursement of postage will be made in each case.

A.S.H.A. WITHDRAWS SPONSORSHIP OF FILM

THE American Social Hygiene Association announces withdrawal of sponsorship of "Damaged Lives," the commercially produced motion picture film they undertook to sponsor a year ago. The Weldon Pictures Corporation, who are the owners of the film, have been asked to remove from the film and all prints thereof and from all advertising, pamphlets, or other material used in connection with future showings, the name of the A.S.H.A. as sponsors.

This action was taken not because of a change in viewpoint as to the value of the film, but because "it has apparently proved impossible for the Weldon Pictures Corporation with its limited organization and commercial affiliations to control undesirable and unauthorized activities of distributors and exhibitors in the local advertising and showings of the films."

HEALTH COUNCIL ESTABLISHED

THE District of Columbia Health and Hospital Council, composed of representatives of medical, dental and civic societies, was recently formed, sponsored by the Council of Social Agencies.

The council will be available to all government authority as a medium of ascertaining opinion and reaction of the majority in professional, administrative and lay organizations representing the citizens in the district, it is stated.

CALIFORNIA A.W.W.A. CONVENTION HELD

THE California Section of the American Water Works Association held its 1934 Convention at Long Beach, Calif., October 24-27.

PERSONALS

PAUL F. RUSSELL, M.D., member A.P.H.A., of the Bureau of Science in Manila, P. I., announces that he has been assigned to work in India, at Kasauli, Punjab. His mail address, for the present, is the All-India Institute of Hygiene, 21 Central Avenue, Calcutta, India.

DR. JOSEPH C. KNOX, Assistant Epidemiologist of the North Carolina State Board of Health, Raleigh, N. C., has been appointed Epidemiologist, succeeding Dr. Daniel F. Milam, member A.P.H.A., who has been transferred to Panama by the International Health Board of the Rockefeller Foundation. He was assigned as consulting epidemiologist to North Carolina 2 years ago. Dr. Robert E. Fox, member A.P.H.A., of Boston, formerly Health Officer of Buncombe County, has been made Assistant Director of County Health Work.

DR. NOLTON N. ASHLEY has been appointed Health Officer of Oakland, Calif., succeeding Arthur Hieronymus, M.D., member A.P.H.A.

DR. STANLEY R. PARKINSON, of Marysville, Calif., has succeeded Dr. James

H. Barr as Health Officer of Yuba County.

DR. DENVER D. ROOS has been appointed Health Officer of Corona, Calif., following the retirement of Dr. William S. Davis.

JACOB J. GOLUB, M.D., member A.P.H.A., sailed for Europe July 5 on his way to spend 2 months as consultant to the Hebrew University in Palestine in connection with the building of the Hebrew University Hospital in Jerusalem.

JOHN O. McREYNOLDS, M.D., associate member A.P.H.A., of Dallas, Tex., recently had the Venezuelan medal of honor conferred on him in recognition of his services to the cause of education "as a mark of the gratitude of the people of Venezuela."

WARREN F. DRAPER, M.D., F.A.P.H.A., of Richmond, Va., Assistant Surgeon General of the U. S. Public Health Service, resigned, and will be succeeded by Dr. J. C. Riggins, F.A.P.H.A., also of Richmond.

CONFERENCES

Nov. 2, Mid-Year Meeting of the New York State Association of Public Health Laboratories, at the State Laboratory, Albany, N. Y.

Nov. 8-10, Missouri Valley Section, American Water Works Association, Omaha, Neb.

Nov. 12-22, Pan-American Sanitary Conference, Buenos Aires, Argentina.

Nov. 12-14, North Carolina Section, American Water Works Association, Elizabeth City, N. C.

Nov. 13-16, Southern Medical Association, San Antonio, Tex.

Nov. 16, 17, 60th Anniversary Meeting, New Jersey Health and Sanitary Association, Berkeley-Carteret Hotel, Asbury Park, N. J.

Dec. 6-8, Annual Meeting, National Society for the Prevention of Blindness, New York, N. Y.

American Journal of Public Health

and THE NATION'S HEALTH

Volume 24

December, 1934

Number 12

Previous History of Poliomyelitis in California*

J. D. DUNSHEE, M.D., F.A.P.H.A., AND I. M. STEVENS, F.A.P.H.A.

Director, and Supervising Morbidity Statistician, State Department of Public Health, San Francisco, Calif.

ACUTE anterior poliomyelitis has occurred in California for many years. Gundrum¹ obtained an accurate account of a case which had developed in Eureka in 1875. This case was in a child aged 2 years with an acute onset "followed in a few days with paralysis in the lower extremities," and the patient stated that another child had developed a similar illness "at about the same time." Gundrum reported further that a careful check of the medical literature failed to reveal any indication of subsequent cases until 1896, although in 1913 he² reported that his investigation had been continued and he had obtained data regarding 2 cases near Bodega Bay, Marin County, in 1888.

Sherman³ in 1897 stated:

It is now over 12 years since I treated a child for indigestion who had a poliomyelitis, and since that time I have never seen a child in whose case the diagnosis was obscure without examining to see if the child could move all its extremities. I have not yet found my second case, but last summer I got to within

2 weeks of the invasion and sometime, if I live long enough, I will make the diagnosis.

During 1896, 8 cases were brought to his attention—7 in San Francisco and 1 in Napa.

Two years later, 1899, Newmark⁴ published his observations: "A Little Epidemic of Poliomyelitis," presenting 4 cases which had occurred in 1898 in Merced County. Three of the cases were in the town of La Grande having only 49 inhabitants, and the 4th was in the outlying district about 3 miles from town. Sawyer⁵ in commenting on the incidence of poliomyelitis in Humboldt County mentioned 1 case at Field's Landing during 1898.

Woods⁶ reported:

During this year (1901) the infection that causes acute anterior poliomyelitis was very lively in this state, it being most active, however, during the months of May and June. The little victims are to be found among all classes, the entire length of the state; at the seaboard towns, as well as in the interior; in the mountain districts, and again from the valleys. By far, the greater proportion was in San Francisco and its immediate vicinity.

Detailed histories of 25 cases were given and reference was made to 30 additional

* Read before the Health Officers Section of the American Public Health Association at the Sixty-third Annual Meeting in Pasadena, Calif., September 3, 1934.

cases in children. The author referred also to several children stricken in San Francisco in 1902. Brown⁷ reported cases in Watsonville and vicinity, Santa Cruz County in 1907, and in Redding and Red Bluff in the northern part of the state during 1909. Sawyer⁸ mentioned 1 case at Samoa, Humboldt County, in 1908.

No additional references to case reports for California prior to 1910, have been found. The morbidity and mortality records for that period as published by the California State Board of Health did not include any reference to the incidence even for the years during which poliomyelitis was known to have occurred, and it was not until 1912 that the term "acute anterior poliomyelitis" was listed as a cause of death. However the U. S. Bureau of the Census first tabulated acute poliomyelitis deaths separately in 1909. Lavinder, Freeman and Frost⁹ in their tabulation of reported deaths and cases for the United States by states credited California with 12 deaths from this infection in 1909 and referred to 67 cases reported by Fleischer.

We are indebted to Dr. F. F. Gundrum of Sacramento for detailed accounts of the prevalence of this disease throughout California during 1910, 1911, and 1912.^{1, 2, 3} The State Board of Health¹⁰ in 1910 detailed him to conduct an official investigation throughout the state. During the same year, the San Francisco County Medical Society appointed a committee for the study of "anterior poliomyelitis" in San Francisco. The report of this committee was compiled and submitted by Fleischer.¹¹

It is interesting to note that all of the above references pertain to cases occurring north of Tehachapi. With the exception of Woods's⁶ statement that cases occurred over full length of the state, one would infer that no outbreak had been observed in Southern Cali-

fornia prior to 1912 when Orbison¹² presented a report on epidemic poliomyelitis in Los Angeles. He stated that during the week ending June 15, 1 case was reported to the health officer, and during the following 4 weeks 77 cases were recorded. Then at the request of the City Health Commissioner a meeting of "physicians, clergymen, laymen, and women" was called on July 19 and as a result a committee was appointed to serve as an advisory board with the Health Commissioner. For the period June 15 to August 27, 1912, 239 cases were officially reported.

The incidence of poliomyelitis in California from 1909 to date as assembled by the State Department of Public Health is shown in Table I.

TABLE I

Year	Cases	Deaths
1909.....	67	12
1910.....	139	29
1911.....	55	13
1912.....	531	129
1913.....	90	33
1914.....	56	27
1915.....	62	19
1916.....	145	24
1917.....	67	26
1918.....	69	20
1919.....	27	9
1920.....	75	30
1921.....	283	49
1922.....	62	24
1923.....	251	33
1924.....	192	34
1925.....	821	144
1926.....	187	30
1927.....	1,298	224
1928.....	303	80
1929.....	171	46
1930.....	1,903	157
1931.....	293	48
1932.....	191	31
1933.....	170	14
1934 (to Aug. 18th)	2,648	64
		(Jan. through July)

We may say that during this period there have been 5 extensive epidemics (see Table II).

TABLE II

	<i>Reported Cases</i>	<i>Deaths</i>
1912.....	531	129
1925.....	821	144
1927.....	1,298	224
1930.....	1,903	157
1934 (to Aug. 18) ..	2,648	64
		(through July)

There was a lapse of 13 years between the first and second epidemics and the last 4 have taken place during the past 9 years at 2, 3, and 4 year intervals. Certainly no regularity of epidemic cycles is apparent.

It is difficult to compare the types of infection in the different epidemics. The basis of diagnosis has varied and also the definition of reportable cases has changed. However, the death rates have confirmed our observation that the 1912 and the 1927 outbreaks were the most severe. The consensus of opinion from the data available at present is that the cases have been mild this year even though the total number of cases greatly exceeds those of any previous year.

In plotting the incidence for each year by months, the peak has usually fallen within the months of July to October; however, in 1896, 1901, and 1934, the highest incidence appeared in June. The records for 1896 are not representative of the state as a whole because only those cases reported by San Francisco physicians are available. In 1901 Woods⁶ referred to a state-

wide epidemic and stated that poliomyelitis was most active during the months of May and June. At no time since 1901, even in any one population center, has the highest incidence appeared as early as May and June until 1934. Observations on the seasonal incidence of poliomyelitis in California to date, indicate conclusively that a consistent increase during March and April is the forerunner of a summer epidemic.

Regarding age distribution, the available data present evidence of a definite shifting of the incidence of this disease in California to the older age groups. Once again the definition of what constitutes a reportable case may be a factor. With better diagnosis more cases among adolescents and adults may be detected. Even assuming that these factors may have played a part in this shifting of age distribution, the fact remains that the percentage of cases among young children has so definitely decreased in favor of the older groups that we feel this trend, observed by Forsbeck and Luther of Massachusetts, Knowlton of Connecticut, and Frost and Das and others,¹³ applies to California also. Gundrum² reported that during 1910-1912, 363, or 72 per cent of the 706 recorded cases, were under 8 years of age. During 1932-1934, 1,253, or 46 per cent of the 2,697 reported cases, were under 10 years of age. An analysis of the 5 epidemics (see Table III) shows the age distribution.

TABLE III

<i>Year</i>	<i>Cases Under 10</i>		<i>Cases Over 10</i>		<i>Total *</i>
	<i>Years of Age</i>	<i>Per Cent</i>	<i>Years of Age</i>	<i>Per Cent</i>	
1912.....	277 †	78.0	254	22.0	531
1925.....	533	65.7	279	34.3	812
1927.....	803	62.9	475	37.1	1,278
1930.....	1,112	59.4	764	40.6	1,876
1934.....	1,034	44.1	1,309	55.9	2,343

(to Aug. 1st)

* Total number of cases with ages specified

† Only available data state cases under 8 years of age instead of under 10 years

During each of these epidemic years there has been a consistent decrease from 78 per cent under 8 years to 44 per cent under 10 years. A more detailed analysis of this shift will be published when all of the data for 1934 have been compiled.

SUMMARY

1. Poliomyelitis is known to have occurred in California since 1875.
2. No data are available to indicate that this infection appeared in Southern California in epidemic form prior to 1912.
3. Records of 5 epidemics, 1912, 1925, 1927, 1930, and 1934, indicate that the June peak in 1934 is unusual.
4. There has been a consistent shifting of the age incidence to the older groups—in 1912, 78 per cent of the

cases were under 8 years of age; in 1934, only 44 per cent were under 10 years of age.

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13. *Report of the International Committee for the Study of Intimate Larynx*, 1932, pp. 396-403.

Measuring Health

. . . Further, it is contended that, in any case, the study of sickness and mortality, and reports thereon, does not represent *health* but disease.

On this last point, which is a cardinal one, it may be said at once that the only way in which it is possible to measure the health of a people, currently and concretely, year by year, is to gauge its degree by recording any departure from health as represented in sickness, incapacity or mortality. For the health of the individual is a physiological balance, an imponderable, subjective and objective, and the disturbance of its happy equipoise is the only indication of ill-health. If that ill-health be smaller or greater, or if our days be

curtailed or prolonged, we can deduce a standard of health. It may be a variable deduction, or even an "unscientific" one—that is inexact and relative only—but there is no alternative method to measure a nation's health apart from a complete periodic assize of the physique of the individuals composing the population—an impossible and fantastic task. Hence we must content ourselves with estimating our own health, or that of the nation by the evidence of the absence or presence, of dis-ease, incapacity or death. . . .
—Extract from the *Annual Report of the Chief Medical Officer of the Ministry of Health for the Year 1933*, p. 252.

Poliomyelitis, 1934*

J. L. POMEROY, M.D., F.A.P.H.A., AND
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SINCE the first of this year poliomyelitis incidence has been above seasonal expectancy, by May 1 there having been 61 cases as against 20 for the corresponding period in 1933. We had been calling attention to this increase and the necessity for early diagnosis and isolation in our weekly bulletin, the *Health Index*. We also announced to the profession the fact that we maintained a limited supply of convalescent poliomyelitis serum, and the necessity of the early administration if results were to be expected. As poliomyelitis has been appearing in California in waves about every 4 years since 1912, the last wave or epidemic having been in 1930, we were apprehensive that the disease was running true to form and that we were facing another epidemic.

The County Health Officer early in May called a meeting with our 12 District Health Officers, and ways and means of combating an epidemic were discussed. The County Health Officer at that time declared his intention of bringing into being a Poliomyelitis Advisory Board whose duties would be to advise with him and determine policies and control measures in a broad way. Accordingly a letter was addressed to a group of the leading physicians of the Los Angeles County Medical Association, who responded to the call, and the

organization was effected on May 14, 1934, with the Chairman of Public Relations Committee of the Los Angeles County Medical Association as President and the Chief of Staff of the California Babies' Hospital as Secretary. Other members were Chief of Staff of the Communicable Disease Division of the County General Hospital and his assistant, Chief of Neurological Service Children's Hospital, Health Officer of Pasadena, Director of Health Service of Los Angeles City Schools, Chief of Staff of the Orthopedic Hospital, Los Angeles City Health Officer and his Epidemiologist, Los Angeles County Health Officer and his Epidemiologist, Professor of Medicine of University of Southern California, Director of California Department of Public Health and his Senior Epidemiologist.

The following program was decided upon and carried out:

1. Bulletin, *What You Should Know about Poliomyelitis* for the lay public. One hundred thousand of these were distributed through the Parent-Teachers Association and various other agencies.
2. Bulletin to be issued by California State Department of Public Health and distributed to all physicians.
3. Circular letter to physicians of this county on symptoms and necessity for early diagnosis and treatment with pooled convalescent serum, the use of which was recommended by the board.
4. Continuation of schools as in normal years with additional provisions for daily medical inspection of all children and prompt isolation and reporting of all showing symptoms suggestive of poliomyelitis.
5. Continuation of regulated swimming with

* Read before the Health Officers Section of the American Public Health Association at the Sixty-third Annual Meeting in Pasadena, Calif., September 3, 1934.

special supervision and instructions relative to the danger of diving and ducking and otherwise washing the protective coating from the nasal mucosa.

6. Passage of a County Camp Ordinance with special provisions for medical inspection before entrance and daily medical inspection thereafter, also provisions for isolation of suspects.

It is noteworthy that not a single case of poliomyelitis developed in any of the camps so supervised.

A policy of taking the public into our confidence and keeping them properly informed of the exact status of the epidemic was agreed upon and followed to our entire satisfaction throughout the course of the outbreak. This was accomplished through the press and over the radio and seemed to be greatly appreciated by the public in general, as expressed editorially by a number of our metropolitan newspapers and by many private communications.

As the epidemic developed it became mandatory that additional funds be provided for diagnostic service, orthopedic service, and various other necessary functions. This request to our Board of Supervisors met with immediate response, so we were enabled to employ the necessary assistance to complete our program.

The matter of providing convalescent serum was a critical one owing to the sharp rise in incidence during the first weeks of May. The Chief of Staff of the Orthopedic Hospital called in a group of convalescents and provided the blood, and the Los Angeles County Health Department Laboratory prepared the serum, in all about 15 gallons. This afforded the chief supply for the General Hospital (the only contagious disease hospital in this county), and made possible the administration of serum from the beginning of the epidemic.

The necessity for early diagnosis and hospitalization was stressed from the beginning, especially in our more con-

gested areas where economic conditions were poor, as it was felt that such procedure would be productive of the best results. This is particularly true in our Belvedere District where the case rate was 1 to 400 population.

Through our policy of keeping the public informed, parents, instead of becoming panicky, would call their family physician, or a health officer in the event they could not secure a private physician, upon the appearance of first symptoms suggestive of poliomyelitis. Consequently, a large majority of our cases were discovered in the preparalytic stage and fully 90 per cent were hospitalized where serum and proper orthopedic care were administered. Those not hospitalized were provided with serum in the homes.

When cases or suspected cases were reported to our health centers a trained diagnostician responded to the call, made thorough examination, epidemiological investigation, and sent the patient to the hospital when indicated.

A trained nurse or physician checked contacts regularly for secondary cases, and also maintained a specially prepared chart in each quarantined home upon which were recorded all minor illnesses. Before releasing quarantine, an inspection was made by a physician and muscle check was made when the patient was in the home. All convalescent patients were routinely muscle checked at regular intervals after release from quarantine and in a few instances "straggling" cases of paresis were detected that had developed subsequent to release.

Our total incidence for the epidemic was 630 with a case fatality rate of $1\frac{1}{2}$ per cent.

In a careful history check of 370 cases we find the following:

1. Of 235 cases which received serum in the preparalytic stage in dosage from 50 to 100 c.c. on the 1st to 3rd day from onset, 213 or 90 per cent proved on muscle check after re-

lease from the hospital to be normal, while 22, or 10 per cent, showed weakness of certain muscle groups.

2. Of 100 paretic cases muscle checked after release from the hospital, 53 per cent showed no extension, 35 per cent showed complete recovery, and 12 per cent showed extension to other muscle groups but not to the extent of causing physical disability. Under present orthopedic treatment the prognosis is regarded as favorable for complete recovery.

3. Thirty-five were found in the muscle check to come in the paralytic class. Twenty-five of these had received serum very late, that is, from the 5th to 12th day from appearance of paresis. Ten were either missed or

refused serum. Our worst cases and the only ones in which we found "Trace or Gone" muscles were in this last group.

In conclusion, we feel that the extremely low case fatality rate and the small percentage of residual paralysis may to a certain extent be credited to three factors: (1) Early diagnosis, (2) early hospitalization and administration of pooled convalescent serum in full dosage, (3) proper orthopedic care while in the hospital and adequate provision for treatment after release.

Syracuse, N. Y., Continues Its High Standard of Health

DESPITE the fact that the budget was again cut, Syracuse, N. Y., reports in 1933 the lowest general mortality rate in the city's history, 10.9; and also established a new low rate for infant mortality, 39.6. For the forty-fifth consecutive year, there was no death from smallpox; there were only 6 local cases and no deaths from diphtheria; while the 4 typhoid fever deaths give a rate of less than 2 per 100,000.

With a birth rate of 16.1 a high average of hospitalization was maintained, 80 per cent of all births taking place in hospitals and 98.9 being attended by physicians. The tuberculosis death rate, 37.4, was a slight rise over the previous year.

As the health commissioner points out, only the facts that 1933 was singularly free from any major outbreaks of acute communicable disease and that supplementary personnel were contrib-

uted by government relief agencies made it possible for Syracuse to continue its high standard of health achievement.

The organization of prenatal and obstetrical service is of interest. There are 7 prenatal clinic sessions per week in the city, but not established as a separate bureau of the Department of Health. Health Department nurses are assigned to each of the clinic stations, and field supervision of the prenatal cases registered in the clinics is a responsibility of the district nurses' program. Medical supervision in the clinics is provided through the Syracuse University Medical School.

Where confinement is within the home, delivery and post-partum services are rendered through the clinic medical staff and the local Visiting Nurse Association, a stipulated charge for this home service being made to the Department of Public Welfare.

Epidemiology of Poliomyelitis in California, 1934*

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UP to a year ago there had been no noteworthy increase of poliomyelitis in California since the last outbreak, that of 1930. Late in the fall of 1933 and during the following winter there was an unusual prevalence for that season of the year, presaging the 1934 epidemic. This prevalence was most marked in the counties nearest to Los Angeles County on the east and south; it is usually the southern part of the state which is first affected in epidemic years. As in other localities when poliomyelitis becomes prevalent, the interval from the previous outbreak gives some indication of the intensity to be expected. These intervals had been increasing in California—2 years between 1925 and 1927, 3 years between 1927 and 1930, and 4 years since the last outbreak, in 1930.

Epidemiological studies of the 1934 epidemic were undertaken by the U. S. Public Health Service and the California State Department of Health, with the coöperation of county and city health departments, and are at present being

carried on in the 4 centers of high incidence. These 4 centers, in chronological order of the appearance of the epidemic, are: Orange County, adjacent to Los Angeles on the south; Los Angeles County; the Bay region, comprising the counties of San Francisco, Alameda, Contra Costa, Marin, Napa, San Mateo, Santa Clara, Solano, and Sonoma; and Fresno County, which is located in the south-central part of the state in the San Joaquin Valley.

As regards the season of its beginning, maximum, and subsidence, this epidemic has been remarkably early, though not unique in this respect. In the equable climate of the Pacific Coast the seasonal occurrence of poliomyelitis might be expected to be, and is in fact, broader than for the United States as a whole. The curve of average incidence usually begins to rise in May, is high by July in the southern part of the state, but reaches a peak in September, somewhat later and less sharp than that for the entire country. As a basis for judging intensity of prevalence in the United States, except for the Southern States, it is convenient to consider 10 paralytic cases per 100,000 per year as a

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"normal" rate or average rate of all such cases reported, with 1 case every 2 weeks for a population of that size during the peak of the season. In the largest epidemic in history, that of New York City in 1916, the rate was approximately 20 times this height; in 1931 about 10 times. In 1916, the reported cases were, in general, frankly paralytic. In later years the diagnosis has come to be made more and more without evidence of paralysis. The case fatality, based on reported cases, in the 1916 epidemic was about 24 per cent; in 1931 about 12 per cent.

At the time of writing, Orange County has reported 40 cases, a rate of 35 per 100,000 population, with 1 death. This case rate is only about $3\frac{1}{2}$ times the normal, and the occurrence of 1 death in 40 cases would correspond to a fatality of about 2.5 per cent. Consistent localization of poliomyelitis, began in Orange County the second week of April. The peak of the outbreak, by onsets, was in May and early June, and the peak and subsidence have been earlier here than elsewhere in the state.

In Los Angeles city and county, the cases were widely scattered geographically, except for a sharp focus in May in the Ruth Protective Home, an institution for infants, children, and young women, located about 3 miles east of the city limits. The incidence of the disease in proportion to the population was remarkably uniform in the 16 assembly districts into which the city was divided, the heaviest incidence being in the most thinly populated district, the San Fernando Valley, and the next heaviest in two of the most thickly populated districts. One of the most thickly populated sections of the county outside the city, Belvedere, has had the heaviest incidence of the whole metropolitan area. The peak of the Los Angeles epidemic, in terms of onsets, was in the first week of June, and the subsidence since then has been generally

consistent, though gradual. The weekly rate was 10 cases per 100,000 at the peak, declining to $2\frac{1}{2}$ cases per 100,000 in the first week of August.

The outbreak in the San Francisco Bay region was sharper and less intense as regards the number of reported cases, than in Southern California. The Bay outbreak had hardly begun in mid-May, when the rate was less than one-tenth of the rate of the Los Angeles area at that time. At the peak, in mid-June, the rate for the Bay had risen to half that of the Los Angeles peak, which occurred 2 weeks earlier. The subsidence of the outbreak was also much more prompt around the Bay, the rate being normal for the season by August 10.

In Fresno, there was not 1 case per week until the middle of June. Since then the incidence in proportion to population has exceeded that in the southern part of the state, the peak by onsets occurring the first of July.

This epidemic has shown peculiarities which have raised questions of interest. One of the most prominent of the latter is that of the occurrence of atypical cases which, in the present paper, are included among the reported cases. Is it correct so to include them? Has there been more than one epidemic disease present? Some of the circumstances of this outbreak may shed light on this question. Mildness has characterized the disease in each of the four foci studied. While it is too early, and the deaths are too few, to emphasize case fatality rates, these have all been remarkably low—6.8 per cent in San Francisco, 2.5 per cent in Orange County, 2.3 per cent in Fresno County, and 1.5 per cent in Los Angeles County. All rates stated for this epidemic are based on all reported cases. However, even if only paralytic cases were considered, the above fatality rates would be remarkably low. Two-thirds of the cases in San Francisco have been

investigated, 63 per cent of these being paralytic. In the Los Angeles area 50 per cent of those investigated were considered paralytic, in Fresno—47 per cent, and in Orange County—57 per cent. Tending also to support the idea that the epidemic as reported is composed of not more than one disease entity is the fact that the atypical cases, relatively mild as regards paralysis, have been reported from various parts of the state roughly in proportion to the occurrence of the frank paralytic poliomyelitis.

Certain peculiarities in age and sex distribution are shown in Table I.

TABLE I
Percentage Distribution

<i>Age</i>	<i>Orange County</i>	<i>Los Angeles County</i>	<i>San Francisco Bay Communities</i>	<i>Fresno County</i>
Under 5 years	23	16	12	17
5 to 9	28	28	28	24
10 to 14	28	19	27	23
15 to 19	13	8	12	16
Males, 20 and over	0	11	9	6
Females, 20 and over	8	18	12	14
Total	100	100	100	100

Although in recent years poliomyelitis has shown less and less selectivity for the youngest age group, the above age distribution, especially as regards adults, is unusual in a population as urban as that involved in this epidemic. In spite of a marked predominance of adults among those whose attacks were atypical, the above age-sex distribution, with relatively high prevalence in adult females as compared with adult males, follows the expected incidence of an infectious disease transmitted by contact with the age group having the more typical cases, namely, the children.

The communicability of the disease in this epidemic was high. This is indicated by its unique incidence among hospital and nursing personnel, discussed elsewhere, and also by the fact that 12.5 per cent of the households so far tabulated with regard to this item,

had multiple cases. This is an unusually high multiple case rate for this disease in communities largely urban.

As commonly observed in poliomyelitis, the distribution of the cases as to milk supply and water supply has given no indication that either of these could have been a major factor in the spread of the disease in foci thus far studied. One advantage which we have had in the survey is the investigation of supposedly uninfected households as controls. The comparison with controls did not indicate any special peculiarity of the cases of poliomyelitis regarding milk or water supply. For the Los

Angeles area these control studies have also tended to exclude the often suspected swimming pools and beaches as primarily important centers for dissemination of infection; 12 per cent of the poliomyelitis patients and 15 per cent of the controls had indulged in this sport. On the other hand, approximately 8 per cent of the patients remembered unusual physical exertion immediately preceding the attack, while only 2 per cent of the controls gave such a history during a corresponding period immediately before the peak of the epidemic.

All the evidence at hand indicates that the mode of spread in this epidemic is similar to that which is usually accepted for poliomyelitis, namely, by contact with human carriers, and to a much less extent, with recognized cases of the disease.

1934 Epidemic of Poliomyelitis in Los Angeles*

Preliminary Report on the Pathological Changes in the Nervous System

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THE variable clinical manifestations of the cases occurring in this epidemic add to the interest in the changes in the nervous system which accompanied them. The large amount of material gave an excellent opportunity for their study. Fifteen cases came to autopsy in the Los Angeles County General Hospital, 11 of which have been summarized on the accompanying chart. Two cases were not included as complete material was not available. A third was complicated by a large cerebellar hemorrhage. All 3 cases showed extensive perivascular infiltration ("cuffing") of the vessels of the pons and medulla. Two showed no lesions in the spinal cord other than hyperemia. Intense perivascular infiltration of the vessels of the spinal cord was present in the third, not comparable to the slight cell destruction.

Dr. Kessel informs us that material from 5 of the 12 cases was successfully inoculated into monkeys. Two others produced atypical results.

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Sections from the spinal cord of the typical cases which have been studied showed lesions similar to those found in the human cases. The lesions in the positive human cases did not differ from those in which the inoculation was unsuccessful. The human lesions in 1 successful animal inoculation were comparatively slight.

The gross appearance of the brain and spinal cord in all cases showed a marked hyperemia of the meninges. The underlying nervous grey and white matter was intensely congested and in several cases cyanotic. Sections showed the same hyperemia. Cross-sections of the spinal cord showed numerous minute hemorrhages in the grey matter.

The microscopic changes were most marked in the medulla, pons, and spinal cord.

The membranes covering these parts showed a variable amount of round cell infiltration. This was most marked around the blood vessels, and though it was usually present at that point, nowhere was it of the degree seen in a moderate meningitis.

The blood vessels throughout the nervous system were distended with red

blood cells. This was present equally in the grey and white matter. In the anterior horns of the spinal cord and in the medulla there were occasional minute capillary hemorrhages. The most characteristic change was the infiltration of the blood vessel walls. This varied from a few round cells to a complete ring. In more advanced cases the perivascular spaces and surrounding tissue were packed with cells. All degrees were seen in the same case and in a single section normal vessels were found alongside of those with more or less infiltration.

The more marked degree resembled the cuffing seen in encephalitis. The different levels of the cord showed great variation. Some sections showed every vessel involved, while in others it was limited to the vessels of the anterior fissure and the anterior horns.

Often the two halves of the cord showed different lesions, perivascular change on one side and nerve cell destruction on the other. This infiltration was often present alongside normal cells.

Irregular clumps of cells were found scattered through the grey and white matter of the cerebrum and cerebellum and more frequently in the pons, medulla, and spinal cord. These varied greatly in size and were largest in the medulla and anterior horn. Those in the anterior horn varied in size from the space of a single cell to occupying the whole of the grey matter. They were composed of cells with round nuclei and scanty protoplasm, cells with very irregular nuclei, an occasional polymorphonuclear leucocyte, and rarely a compound granular corpuscle.

In a few instances the polymorphonuclear cells predominated.

These clumps were not related to the perivascular changes, as they occurred independently in various sections.

It is probable that these clumps were partly formed by microglia and glia cells as well as lymphocytes.

The clumps in the medulla were often of large size extending into both grey and white matter.

The changes in the nerve cells were largely limited to the motor cells of the anterior horn of the spinal cord and to the bulbar nuclei.*

The changes may be described as follows: Nissl bodies diffusely staining; Nissl substance clumped in the periphery of the cell; complete disappearance of the Nissl bodies and shrinking of the cytoplasm of the cells.

Neuronophagia was not marked. An occasional cell could be seen surrounded by round cells, but it was only rarely that the nerve cell was replaced by the phagocytes.

The areas where cell destruction was most marked, often showed no traces of nerve cells, the whole of the grey matter being filled with cells with irregular nuclei.

Careful search revealed shrunken cells with unstained cytoplasm. Fragments of cell processes could be rarely observed. Normal cells were often present on the edges of these areas.

The changes in the nerve cells in the medulla and pons were limited to the slighter changes described, very little complete destruction being observed in the cases examined.

The destructive changes were most marked in the motor cells of the spinal cord.

Perivascular cuffing was a prominent feature of all cases. Irregular clumps of cells were diffusely scattered through the whole nervous system.

A complete report is in course of preparation.

* Gallocyanin was used to stain the nerve cells for this study, as we believed it gave more even staining than methylene blue, thionin or cresyl violet.

Clinical Features of Poliomyelitis in Los Angeles^a

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THE poliomyelitis seen here in 1934 was quite variable in its manifestations and difficult to describe, for there was no uniform clinical picture. The high adult morbidity was itself a variation. The symptoms were, for the most part, milder than usual, and the sequelae were less crippling. An initial toxemia was present in most cases, but this was not often severe, and the early neurological, or localizing findings, which ordinarily help to differentiate pre-paralytic poliomyelitis from the systemic phase of other acute infections, were absent in many cases. The severe frontal headache, or painful oculomotion, that is usually complained of, was not always present. Sore throat, often without local findings, was a frequent complaint. Diarrhea, often with the severe abdominal cramps and vomiting of acute gastroenteritis, was quite common. When seen without systemic or respiratory symptoms, and when developing lumbar cord findings, this was suggestive of an intestinal portal of entry.

Mental dullness at times seemed out of proportion to the degree of toxemia, a cerebral involvement common in some gastrointestinal diseases. Pain in the

cervical or lumbar areas was often present, but the usual spinal rigidity was noticeably absent in many cases. In spite of this flaccidity, however, spinal flexion, with stretch of the dura about the nerve roots, caused cervical or lumbar pain in most cases, an early finding which we called the "spine sign." Headache, or pain in the back or abdomen, induced or accentuated by slight trauma, was noticeable, even in those cases showing no increase in intrathecal pressure. The degree and duration of muscle pain, tenderness and severe cramping, were out of proportion to the motor phenomena. The treachery of the disease was more marked than usual, some cases suddenly developing nervous system findings without premonitory symptoms, and others relapsing severely after apparent recovery from mild attacks. Even more striking was the rapid, and apparently complete, recovery of some cases which appeared early to be doomed to extensive residual paralyses. The persistence of reflexes, even in the presence of marked muscle weakness, was most pronounced. Some cases showed no weakness on test, but complained of marked fatigability.

The sensory phenomena were interesting. Hyperesthesia and accentuation of acute pain and thermal sense were sometimes limited to the extremity

^a Read before the Health Officers Section of the American Public Health Association at the Sixty-third Annual Meeting in Pasadena, Calif., September 3, 1934.

opposite that of the motor and proprioceptive phenomena, an indication of a unilateral myelitis. Localized profuse sweating occurred over these same areas. Temporary surface anesthesia over areas corresponding to the nerve distribution from the individual cord segments, was occasionally seen.

The degree of abdominal pain, distention, and vomiting sometimes suggested primary intra-abdominal pathology, but the absence of rigidity, and the association of urinary retention and lumbar backache, seemed to incriminate both the sympathetic and central nervous systems. Also, the sudden relief after spinal puncture, even in cases showing no increased intra-theal pressure, indicated a paralytic ileus, an uncommon phenomenon in our previous experience.

An unusual number of cases showed no increase in spinal fluid pressure, but were relieved of headache or abdominal symptoms by spinal puncture. Our explanation was the probable relief of cellular edema about the posterior horn cells, or nerve roots, occasioned by shifting of balanced osmotic pressures between the spinal fluid and the perineural circulation or lymph. The shift being toward the spinal canal would tend to reduce capillary tension, and hence edema, even though the osmotic balance between the two systems had been established at a low level.

The tendency to relapse was a constant threat, the recurrence of systemic symptoms suggesting the possibility of reinfection or activation of some focus within the body. Remote sequelae of a psychasthenic or neurasthenic nature were more common than previously noted. Insomnia and nightmare were complained of. Irritability and emotional instability were noted, and some complained of mental fatigability with poor power of concentration, all of which might be indicative of mild cerebral involvement. Neuro-circulatory

asthenia was common, the sudden weakness, vertigo, palpitation and breathlessness probably being due to sudden lowering of vascular tension incident to sympathetic dysfunction. Continued localized sweating was also of probable sympathetic origin, although the common herpes was more likely of posterior horn cell origin.

Space does not permit of a discussion of the problem of differential diagnosis. Unbelievable as it seems, we have seen 55 different conditions sent in as poliomyelitis, which proved to be something else, some of them far removed from central nervous system diseases.

Clinical observations of treatment were interesting. Prophylactic convalescent serum apparently failed to afford any marked degree of passive immunity for, of 207 of the hospital personnel thus injected, 48, or 23 per cent contracted the disease within 3 weeks. This incidence is far above the average for the population at large. These patients were, on the average, far the sickest of any group, and remained longest in the hospital. Overwork and excess fatigability are probably undoubted factors.

Convalescent serum as a therapeutic agent has proved of value, in our experience. We agree that little is to be expected of it after the central nervous system has been invaded beyond the stage of initial inflammation, but we feel that it has virtue if used in the pre-paralytic stage, and that present standards of diagnosis permit of this early recognition of the disease. The rapid abatement of symptoms following its use was usually quite striking, and this was further emphasized in those cases which relapsed 2 and 3 times and were immediately relieved on each occasion by additional serum. Intra-theal medication was not indicated in this epidemic as often as in previous ones, but we still feel that in spite of the failure of ex-

perimenters to demonstrate virus in the spinal fluid, this method of administration has proved valuable in the past, particularly the injection into the cistern in close proximity to the usual portal of entry of virus into the central nervous system. The apparent benefit may be mechanical or hydrostatic, but such cannot be claimed for the more common intra-muscular therapy. Virus has never been demonstrated in the blood, but the fact that immune bodies are present in its serum denotes a relationship, and the rapid dissemination of blood to all tissues of the body, recommends intravenous medication early to bridge the first 18 to 20 hours required for absorption from the muscles.

Immuno-transfusion has been recommended as the one most advantageous therapeutic measure. The arguments in favor of serum apply to the use of blood containing it, and in addition there is the advantage of stimulation afforded the reticulo-endothelial system. The outstanding results obtained with this form of therapy in other virus diseases is well known, but were not duplicated in this experience. The many cases of infection among doctors and nurses threatened us with a shortage of trained personnel, and in an effort to forestall such an emergency and give these patients every advantage, a blanket-order was given to immuno-transfuse all physicians and nurses in addition to giving them intra-muscular serum. This was a fortunate coincidence, for many were mildly ill, and the limited number of suitable immunedonors were consequently utilized for all patients of this group. This facilitated comparison with a parallel group treated with intra-muscular serum, but with intravenous dextrose (10 per cent in normal saline) instead of transfusion with blood. Sixty cases were transfused. Fifty-five of them were unquestionably improved within 24 hours. Five (8.3 per cent) were very much worse in a

similar length of time. Naturally there was no way of determining whether or not these patients would have been just as bad, or even worse, without the transfusions, but they were the sicker of the two groups and the transfused group were longer.

On the other hand, the dextrose-treated patients were not consecutive cases of average severity, but were the most toxic of the lay admissions. They were, without exception, markedly improved within 24 hours, some of them from a degree of toxicity that bordered on delirium, to a condition which they described as almost normal subjectively. The reason for the difference in the two groups is not obvious.

Dextrose is valuable in combating any toxemia, because of its part in stimulating hepatic glycogenesis and glycolysis, its indirect effect on hydrogenion concentration of the blood through ketolysis, and its questionable antivirucidal properties. It is not specific. Immuno-transfusion, on the other hand, is specific, but involves the factor of serum heterogeneity, independent of agglutinins, a factor which cannot be predetermined and one which constitutes a hazard difficult to evaluate. The phenomenon of allergy, or whatever explanation is offered for the spontaneous damage to the choroid produced experimentally in animals by intravenous injections of foreign serums, may have a counterpart in the occasional, unexplained cerebral reaction exhibited by patients during transfusions with apparently homologous bloods. This may account for the small percentage of bad results from immuno-transfusion. We feel that in cases showing involvement of the nervous system, in which no harm can be done by possible injury to already damaged natural barriers, that immuno-transfusion may be safely and advantageously used. There is a definite hazard attending its early use.

The 1934 Epidemic of Poliomyelitis in Southern California*

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ALWAYS considered baffling and puzzling, first known as sporadic disease and then, as the years went by, growing increasingly epidemic, poliomyelitis always has been protean in nature, and in this 1934 epidemic in Southern California, more than ever has the fact been demonstrated that disease and epidemics, like other affairs in this world, undergo constant change.

Never before in any epidemic have there been so many institutional cases; never so many familial cases; never so many doctors, nurses and other hospital attendants who have contracted the disease; never an epidemic of similar proportions with so low a death rate, with so many of the spinal type, so many with only paresis, or neuritis, so many of the straggling or recurrent variety, so many abortive, so few encephalitic; never before an epidemic where 80 per cent of the cases were hospitalized, more than half of them in the early systemic phase.

November and December, 1933, and January, 1934, we noticed that we were getting about twice the normal sporadic incidence of cases, 6 or 8 monthly instead of the usual 2 or 4.

In the last week of April, 1934, 9 cases occurred, and by the middle of May we found that we were on an up-

wave that was terrifying in its rapidity. The last week in May gave us a total of 95 cases, 51 for the city, and 44 for the county outside.

Alhambra to the northeast, Belvedere to the east, early became centers of infection and our spot map of the city presented almost a straight line from the Northeastern to the Southwestern part, with a particularly heavy grouping directly to the west of Belvedere into the very center of the city and the Bunker Hill district.

The peak of the wave was reached in the week ending June 9, with 220 cases: June 16 showed 199 cases; June 23, 204 cases; and June 30, 209 cases. There was a rapid rise from May 5 to the peak, then 3 weeks at an almost stationary high, since when there has been a gradual decline.

The total number of cases, city and county, to September 3, 1934, was 1,792, with 25 deaths; cases in city, 1,112, with 15 deaths; cases in county, 680, with 10 deaths; death rate, city, 1.16 per 100,000; county, 0.98; total city and county, 1.08; morbidity or case rate 73.3 per 100,000; mortality rate 1.39 per cent. The Children's Hospital had 1 doctor and 4 nurses contract the disease; the Ross-Loose Clinic, 6 nurses; the Pasadena Hospital, 1 doctor and 3 nurses; the Glendale Medical Group, 2 doctors and 1 nurse; the Orthopaedic Hospital, 1 nurse. The

* Read before the Health Officers Section of the American Public Health Association at the Sixty-third Annual Meeting in Pasadena, Calif., September 3, 1934.

General Hospital (to August 27, 1934) had 2 staff doctors, 3 residents, 13 internes, 58 graduate nurses, 39 student nurses, and 22 others—a total of 137 who contracted the disease.

With the exception of the Elmonte Home for Juveniles, capacity 100, where there were 11 cases, juvenile institutions, orphan asylums, etc., were remarkably free. At Juvenile Hall, within a stone's throw of the General Hospital, where the daily turnover is 25 to 30 children, and 250 the average in residence, not a single case occurred.

Early in the year, the majority of cases occurred in those under 5; during the upwave the majority were in the 5-10 year group, the 10-15 year group coming next; but a greater number in the older groups were coming down during the 3 weeks that rounded out the peak of the wave, and since. There was an increasing tendency to attack the older ages as the epidemic waned.

The City of Los Angeles has an estimated population as of January 1, 1934, of 1,293,329, the surrounding county territory, a population of 1,013,775, making a total of 2,307,104, all served by the Los Angeles General Hospital. The New Acute Unit was opened December 12, 1933, just in time for this epidemic. Without this new unit, throwing open new wards, also making available plenty of wards in the old buildings, this epidemic would have overwhelmed us. The normal capacity of the Communicable Disease Building, 6 wards, is 245 beds, with 86 nurses. At the height of the epidemic there were 21 wards with 364 nurses caring

for 724 patients, 360 of whom had poliomyelitis.

All epidemic suspects were admitted through the communicable disease admitting room, examined, and assigned to wards as rapidly as possible. Definite cases of poliomyelitis were segregated; suspects and contacts were sifted and grouped. All suspects were held 10 days for observation, and known direct contacts for 14 days. All suspects and contacts released at the end of these periods were required to report back for muscle checks at a specified time, to avoid overlooking mild cases.

During the heavy month of June, the average daily number of suspects admitted was 103, of cases of poliomyelitis 22: a ratio of almost 5 to 1. Patients were parked on stretchers and in automobiles in the court, awaiting admission. Doctors, nurses, orderlies, maids, ambulance drivers, and all others worked overtime, often for 24 to 48 hours without let up. Fatigue, loss of sleep, and constant exposure to poliomyelitis in its most infectious stage was common to all. Slightly more than half of the hospital employees who contracted the disease were directly and constantly exposed; the others were indirect contacts.

A sufficient number of doctors who are thoroughly grounded by precept and practice in "Medical Aseptic Technique" as applied to communicable disease control, and nurses should be available to meet an epidemic of such proportions. Should not the American Public Health Association lay greater stress upon such teaching in the nation's medical and nursing schools?

Use of Serum and the Routine and Experimental Laboratory Findings in the 1934 Poliomyelitis Epidemic*

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WITH the onset of the poliomyelitis epidemic in Los Angeles in 1934 it was decided to hospitalize all poliomyelitis patients from within the county and city in the Los Angeles County Hospital. This placed additional burdens on many services of the hospital, which in a few weeks increased the patients in the Communicable Diseases Unit from 240 to 750. Among duties assigned to the bacteriological laboratory were:

1. Preparing and testing serum for therapeutic and prophylactic purposes
2. Examination and cultivation of spinal fluids
3. Special laboratory work in isolating the virus and in cross-immunity experiments

It was necessary to establish new emergency units: (1) in the Communicable Diseases building where the spinal fluid work was done, and (2) for the animal experimental work. One hundred and fifty monkeys as well as a number of smaller animals were procured for the special laboratory work. Additional laboratory personnel was required and 18 second or third year

medical and graduate students, who were just beginning their summer vacations were selected. These students worked faithfully, and without their services the work here reported would have been impossible. One developed poliomyelitis during the 10th week of the epidemic. The hospital administration provided special needs whenever possible and deserve commendation for their coöperation in meeting the emergency.

The present report is preliminary since much of the work is still in progress. In preparing summaries of the laboratory work it has been expedient occasionally to refer to certain clinical and epidemiologic aspects of the epidemic for comparison. Of special interest in this connection is the group of employees who developed poliomyelitis, a certain percentage of whom received prophylactic serum.

I. PREPARATION AND USE OF SERUM

At the onset of the epidemic California as a state and Los Angeles as a community appeared to be especially serum conscious, since the state and local health departments advocated its extensive use both for therapeutic and prophylactic purposes. It was not possible from an administrative and clinical viewpoint, though desirable scien-

* Preliminary Report on the preparation and use of serum and the routine and experimental laboratory findings of the Los Angeles County Hospital Bacteriological Laboratory during the poliomyelitis epidemic. Read before the Health Officers Section of the American Public Health Association at the Sixty-third Annual Meeting in Pasadena, Calif., September 3, 1934.

tifically, to withhold serum from control groups of patients; consequently the value of the records concerning its therapeutic value is greatly reduced. Controls for the prophylactic use were found in the group who elected to take no serum.

Serum used in the Los Angeles County Hospital was obtained from two sources (1) convalescent pooled serum prepared by Dr. R. V. Stone of the Los Angeles County Health Department laboratories and purchased through the Orthopedic Hospital, (2) convalescent pooled serum and normal pooled serum prepared in our own laboratory. Altogether 121,000 c.c. have been administered to date.

All donors were checked for negative Wassermann and Kahn tests. Donors were bled individually (250-500 c.c.) into suction flasks. In many instances two donors were bled into one flask. Flasks were kept several hours at room temperature, then placed in the ice box

over night. Serums were decanted and centrifuged twice, pooled in flasks, 10 to 20 donors to a pool, preservatives added, left over night at room temperature, then put in 20 c.c. or 50 c.c. bottles and kept at ice box temperature until dispensed. The preservatives employed were:

- a. Merthiolate 1/10,000
- b. Formalin 0.2%, Glycerine 0.5%
- c. Phenol 0.25%

Aerobic and anaerobic cultures were made from first and last portions of serum removed from each 1,000 c.c. pooling flask at time of bottling, also from one bottle taken at random from each lot. Cultures were watched for 5 days and before serum was dispensed, bottles were observed in front of a light. Those showing any foreign particles were labelled "For intramuscular use only"; others "For intravenous use." The labels also showed date of pooling and the individual pooling flask from which the bottles were filled.

TABLE I
LOS ANGELES COUNTY HOSPITAL EMPLOYEES WHO DEVELOPED POLIOMYELITIS
May 20 to Sept. 1, 1934

		Number Developing Poliomyelitis		Per cent	
		Number			
Working in C.D.		483	57	11.9	
Working in other parts of Hospital		3,503	57	1.3	
Physicians	{	Living in Hospital	160	16	10
		Living Outside Hospital	590	3	0.6
Nurses	{	C.D. Contact { Living in Hospital	75	27	36.0
		Living outside Hospital	277	24	8.5
	{	Not in C.D. { Living in Hospital	435	37	9.0
		Living outside Hospital	297	14	5.0
	{	Total { Living in Hospital	475	50	10.5
		Living outside Hospital	609	38	6.2

C. D.: Communicable Disease Unit.

Prophylactic Serum—This epidemic has afforded an unusual opportunity for the study of the value of prophylactic serum because of the unusually high degree of communicability. Among the Los Angeles County Hospital employees alone, 115 developed poliomyelitis. Many of these can be traced to contact infection. Table I shows that 11.9 per cent of employees working in Communicable Disease Unit, as against 1.3 per cent of employees in other parts of the hospital developed poliomyelitis; also that among the nurses working in the Communicable Diseases Unit 36 per cent living in the nurses' dormitories developed poliomyelitis. Among the physicians 10 per cent living in the hospital developed poliomyelitis.

Table II illustrates graphically as based on the date of onset the possible sources of infection of the first 5 nurses to develop poliomyelitis, and how they probably were factors in the rapid spread to others. It would appear that we are dealing with a standardized group of individuals since they were working and living under more or less uniform conditions during an epidemic in which the rate of communicability was exceptionally high.

Prophylactic serum was given to all

employees who elected to take it. Twenty c.c. of either convalescent pooled or normal pooled serum was given and it was recommended that this or larger doses be repeated every 2 weeks.

Table III summarizes the prophylactic serum administered to employees. It shows that 52.6 per cent of the 115 employees who developed poliomyelitis had received serum prophylactically while 47.4 per cent had received no serum, also that 14 per cent of those working in Communicable Diseases Unit who received serum as a prophylactic measure developed poliomyelitis, against 9.7 per cent of those who received no serum.

Table IV is an analysis of the prophylactic serum in terms of amounts given to the different groups. Several observations may be made: (1) Those receiving convalescent pooled serum showed no less degree of susceptibility than those who received the normal pooled serum. (2) The numbers developing poliomyelitis do not decrease appreciably as the amounts of serum administered increase. (3) Fourteen per cent of employees working in Communicable Diseases Unit who received prophylactic serum developed polio-

TABLE II
POSSIBLE SOURCES OF INFECTION

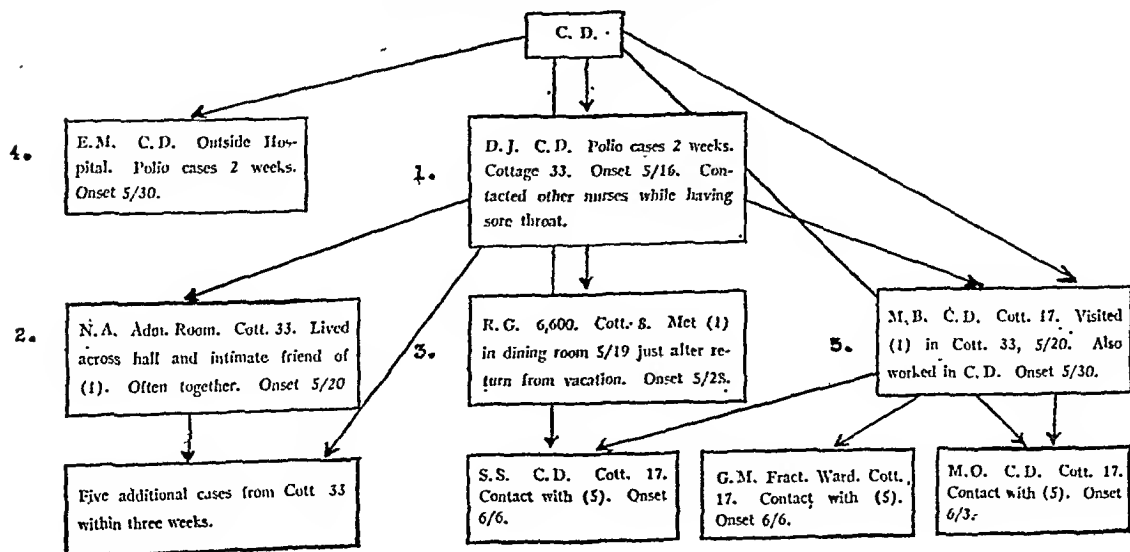


TABLE III

POLIOMYELITIS ANTISERUM USED PROPHYLACTICALLY IN LOS ANGELES COUNTY HOSPITAL

		Number	Per cent	
Los Angeles County Hospital Employees who developed Poliomyelitis		115		
Number who received prophylactic serum		61	52.6	
Number who received no prophylactic serum		54	47.4	
		Number	Per cent	
		Positive	Positive	
C. D.	{ Employees who received serum	235	32	14
	{ Employees who received no serum	261	35	9.7
Not in C. D.	{ Employees who received serum	695	29	4.5
	{ Employees who received no serum	2,525	79	1.0
Total	{ Employees who received serum	892	61	6.8
	{ Employees who received no serum	3,024	54	1.7

myelitis, as against 4.5 per cent working in other parts of the hospital.

of which received serum and one no serum. The only fact of significance is that the percentage of those developing paralysis is lower in the group receiving

Table V shows the severity of symptoms in relation to the two groups, one

TABLE IV

DETAILED ANALYSIS OF POLIOMYELITIS ANTISERUM USED PROPHYLACTICALLY BY LOS ANGELES COUNTY HOSPITAL EMPLOYEES

		Amounts of Serum	Number	Number developing Polio- myelitis	Per cent developing Polio- myelitis
Working in C. D.	Normal Pooled Serum	20-40 c.c.	81	13	16
		40-100 c.c.	5	1	20
		100 c.c.	0	0	0
	Convalescent Serum	20-40 c.c.	86	14	16.5
		40-100 c.c.	39	2	5.1
		100 c.c.	17	2	12.0
Total		228	32	14.0	
Not working in C. D.	Normal Pooled Serum	20-40 c.c.	467	22	4.8
		40-100 c.c.	7	0	0
		100 c.c.	0	0	0
	Convalescent Serum	20-40 c.c.	147	4	2.8
		40-100 c.c.	38	2	5.3
		100 c.c.	6	1	16.6
Total		665	29	4.5	

TABLE V
EMPLOYEES GROUP
PROPHYLACTIC SERUM IN TERMS OF SEVERITY OF SYMPTOMS

	<i>No Weakness</i>		<i>Weakness</i>		<i>Possible Paralysis</i>		<i>Total</i>
	<i>No.</i>	<i>Per cent</i>	<i>No.</i>	<i>Per cent</i>	<i>No.</i>	<i>Per cent</i>	
Convalescent	9	40	14	60	—	—	23
Normal Pooled	10	27	26	70	1	3	37
Total	19	32	40	66	1	2	60
No Serum	14	25	36	67	4	8	54

* No deaths in this group

serum, but since the figures are so small it is impossible to attribute a great deal of weight to this observation.

CONCLUSIONS

1. There is no evidence to show that employees receiving prophylactic serum, all having a similar exposure, were more immune than those receiving no serum. In fact the percentage of those developing poliomyelitis is higher among those who received serum than among those who did not. Just why this should be is a question. One explanation might be that those who were most likely to apply for serum were subject to greatest exposure.

2. There is some evidence to show that those receiving prophylactic serum developed less paralysis than those receiving no serum.

Therapeutic Use of Serum—Since no controls were used, it is impossible to

state whether serum treated cases progressed more favorably than they would have without serum. Convalescent pooled and normal pooled serum were given to alternate cases so far as was possible, and Table VI is a summary of 575 cases to whom serum was given. This table at least indicates that convalescent pooled serum is no more effective than normal pooled serum. Higher percentages are shown among those who developed weakness and paralysis in the group receiving convalescent pooled serum than among the patients receiving normal pooled serum.

Serum Reactions—With the administration of human serum to so large a number of people an excellent opportunity was afforded to observe reactions. About 8 per cent of patients complained of some subjective reaction ranging from a mild to a severe type of serum sick-

TABLE VI
THERAPEUTIC USE OF SERUM

<i>Serum</i>		<i>No Weakness</i>	<i>Weakness</i>	<i>Possible Polio</i>	<i>Deaths</i>	<i>Total</i>
Normal Pooled	{ No.	192	50	1	8	251
	{ Per cent	77	20	—	3	
Convalescent Pooled	{ No.	191	111	14	8	324
	{ Per cent	59	35	4	2	
Total		383	161	15	16	575

ness, while about 40 per cent complained of painful reactions soon after injection.

A series of intradermal tests was designed in an attempt to determine the skin sensitivity of patients, and it was found that among the 8 per cent who complained of serum reactions, all of the cases tested who had received serum prophylactically and 60 per cent of those who had received it therapeutically, gave positive reactions, while a much smaller percentage of those who

had no serum symptoms exhibited sensitivity.

For the most part two types of preservatives were used in the serum, 1/10,000 merthiolate and formalin-glycerine. When reactions were reported from intramuscular injection, those receiving the formalin-glycerine complained of an immediate severe pain near the injection, accompanied by varying degrees of nausea, dizziness, and weakness. This usually subsided within 20 to 30 minutes, after which no

TABLE VII

REACTION RESULTING FROM THE ADMINISTRATION OF HUMAN SERUM IN LOS ANGELES POLIOMYELITIS EPIDEMIC COMPARED WITH INTRADERMAL REACTIVITY OF PATIENTS

Prophylactic Administration Total Patients * 65			Therapeutic Administration Total Patients * 61		
	No. of Cases	Per cent		No. of Cases	Per cent
Reactive to serum	5	8	Reactive to serum	5	8.2
Reactive to trauma	24	37	Reactive to trauma	25	41
Intradermal Tests			Intradermal Tests		
Serumatic reactive	5	100	Serumatics reactive	3	60
Traumatics reactive	8	33	Traumatics reactive	6	24
No complaints reactive	5	14	No complaints reactive	11	35
Total patients with allergic histories	11	17	Total patients with allergic histories	20	33
Allergics reactive to serum skin tests	5		Allergics reactive to serum skin tests	7	
In terms of allergics		46	In terms of allergics		35
Non-allergics reactive to serum skin tests	27		Non-allergics reactive to serum skin tests	13	
In terms of non-allergics		50	In terms of non-allergics		32

TABLE VIII

EFFECT OF INJECTING HUMAN SERUM PROPHYLACTICALLY FOR POLIOMYELITIS
TOTAL PATIENTS—65

	No. of Cases	Per cent
Patients with complaints from injection	29	45
Patients without complaints from injection	36	55
Complaints from injection of formalin glycerine serum	4	
In terms of total injections * of formalin glycerine serum		66
Complaints from injection of merthiolated serum	24	
In terms of total injections † of merthiolated serum		41
No complaints from injections of formalin glycerine serum	2	34
No complaints from injections of merthiolated serum	33	59

* Total injections with formalin glycerine serum 6
† Total injections with merthiolated serum 58
One patient received unpreserved serum

difficulty was observed. No local tenderness was reported at the point of injection. The merthiolate preserved serum gave no severe reactions at the time of injection but in certain instances soreness developed at the point of injection within 12 hours. This muscle soreness persisted as a rule for about 48 hours.

Tables VII and VIII give summaries of preliminary observations on this point.

II. OBSERVATIONS ON SPINAL FLUID EXAMINATIONS

There have been made to date 1,598 spinal fluid examinations on 1,300 patients diagnosed as poliomyelitis. The examinations were uniform since they were performed by a special group of technicians.

Table IX shows the cell counts. It will be observed that 27 per cent showed no cells, 38 per cent gave a count of 1-9, and 35 per cent of 10 or more. Five per cent of the total gave a positive globulin test even though no cells were present.

Table X gives a comparison of spinal cell counts with colloidal benzoin tests. Fifty-six per cent of those showing more than 10 cells gave a positive colloidal benzoin reaction against 32 per cent of those showing a count of less than 10.

Table XI summarizes the cell counts on the basis of date of onset. A higher percentage of positive counts was ob-

TABLE IX
SPINAL FLUID COUNTS

	<i>No.</i>	<i>Percentage</i>
No cells	434	27
Cells 1-9	609	38
Cells 10	555	35
<i>Totals</i>	<u>1,598</u>	<u>100</u>
Globulin but no cells	85	5

tained during the first 8 days of onset than later. There was very little difference between the percentage of counts during the first 4 days and the second 4 days.

Table XII correlates spinal cell counts with severity of symptoms. This table may be compared with that of Laidlaw (1932).¹

While the percentage of those recovered without weakness fails to show any special correlation with high or low cell counts it does show that those cases which at present give indication of a permanent paralysis, and also the deaths, in most cases are among the higher cell count groups.

III. EXPERIMENTAL WORK

The special laboratory work was organized with the following program in mind. (1) Recovery of virus from the present epidemic. (2) Comparison of the virus with other strains. (3) Neu-

TABLE X
CORRELATION OF COLLOIDAL BENZOIN AND SPINAL CELL COUNTS

	<i>Colloidal Benzoin</i>				
	<i>Positive</i>		<i>Negative</i>		
	<i>Number</i>	<i>Per cent</i>	<i>Number</i>	<i>Per cent</i>	<i>Totals</i>
No cells	27	32	58	69	85
1-9	38	23	128	77	166
10	119	56	78	44	197

TABLE XI
COMPARISON OF SPINAL CELL COUNTS AND DATE OF ONSET

Days	Positive		Negative		Totals
	Number	Per cent	Number	Per cent	
1-4	128	47	145	53	273
5-8	57	46	64	54	121
9-	24	38	40	62	64

tralization tests with serum prepared for use in the present epidemic.

Recovery of the virus was attempted from three main sources:

1. *Brain and spinal cord of necropsy cases*—Material from the brain or spinal cord of 11 cases has been injected intracerebrally into monkeys. Monkeys from 7 of these cases have developed temperature curves characteristic of poliomyelitis in monkeys. Monkeys from 5 of the cases only have developed characteristic paralysis and exhibited histopathology in the brain and cord characteristic of poliomyelitis. Two of these strains have been selected for special study and have now been carried through the fifth passage in monkeys.*

Monkeys which have developed characteristic temperatures but failed

to develop paralysis have resisted subsequent inoculation with the M. V. strain of virus, thus indicating that recovery from the California strain produces immunity for at least one other standard strain.

The strains of virus which we have passed through several monkeys give an incubation period with an average of 10½ days. This is longer than the incubation period of the M. V. virus at present, and also longer than during its early transmission to monkeys by Flexner and Lewis in 1909.

2. *Nasal Washings*—Nasal washings from clinically positive cases, some showing positive and others negative spinal counts were inoculated into monkeys by the intracerebral route. Of 45 attempts, all were negative with the possible exception of 2 monkeys which developed a characteristic temperature curve but failed to show paralysis.

3. *Concentrated spinal fluids from cases giving positive cell counts*—Twenty-five attempts were made to in-

* Brain and spinal cord tissue from most of these Los Angeles County Hospital autopsies was furnished to Drs. L. T. Webster, J. R. Paul, and J. D. Trask, who were working in Los Angeles Laboratory at the time. Their results and ours were similar in the recovery of the virus.

TABLE XII
COMPARISON OF SPINAL CELL COUNTS WITH REFERENCE TO SEVERITY OF SYMPTOMS

Cell Count per c.mm.	Severity of Symptoms				Cases, Total Number	Per cent Recovery Without Weakness
	No Weakness	Weakness	Possible Paralysis	Death		
None	64	24				
1-9	109	58	1		89	72
10-49	82	23	3	1	171	64
50-99	41	10	5	8	118	69
100-199	21	5	3	1	55	75
200	16	2	1	2	29	72
Total	333	122	13	13	481	84

fect monkeys with spinal fluid from cases with positive spinal cell counts, all with negative results.

Attempts to inoculate young rabbits, guinea pigs, rats, and mice with human tissue from poliomyelitis cases which produced positive results in monkeys were negative.

Neutralization experiments testing the antisera used prophylactically and therapeutically in the present epidemic and also testing the serum of patients recovered from the current epidemic are in progress.

The experimental work in which monkeys have been successfully inoculated with brain and cord from cases of the 1934 epidemic in Los Angeles lends support to the clinical impression that this is an epidemic of poliomyelitis, though there are many points of difference between this outbreak and other epidemics.

Some preliminary evidence has been presented which indicates that monkeys recovered from mild attacks brought on by inoculation with the California virus are immune to subsequent inoculation with the M. V. virus. This fact indicates an antigenic relationship between the two strains.

SUMMARY

The 1934 poliomyelitis epidemic in Los Angeles has been unusual in several aspects.

1. The mortality rate has been exceptionally low.

2. The amount of residual paralysis has been less than usual.

3. The percentage of adults infected has been higher than is common.

4. An exceptionally high rate of communicability has been noted, this being especially apparent among hospital employees where in the communicable disease unit of the Los Angeles County Hospital, 11.9 per cent developed poliomyelitis.

Certain preliminary observations from the laboratory of the Los Angeles County Hospital during this epidemic are as follows:

1. Employees receiving convalescent pooled and normal pooled poliomyelitis serum as a prophylactic measure demonstrated no less degree of susceptibility than employees working under similar conditions who received no serum.

2. There is slight evidence that those receiving prophylactic serum developed less severe symptoms than those who received no serum.

3. Convalescent pooled serum was no more effective when given therapeutically than normal pooled serum. Since no untreated controls were used it is impossible to evaluate the therapeutic use of serum.

4. A small percentage of the patients reported serum reactions, ranging from a mild to a severe type of serum sickness.

5. A high percentage of those who demonstrated positive serum symptoms responded to skin sensitivity tests with human serum.

6. Spinal cell counts of poliomyelitis cases demonstrated that 27 per cent showed no white cells, 38 per cent, 1 to 9 cells, and 35 per cent 10 or more cells.

7. Fifty-six per cent of those showing more than 10 cells gave a positive colloidal benzoin reaction.

8. Attempts to inoculate monkeys with virus from 11 autopsy cases have given positive results from 5.

9. The virus appears to possess an antigenic relationship to M. V. strain since monkeys which recovered from inoculation with the Californian strain are resistant to subsequent inoculation with the M. V. strain.

REFERENCE

1. Laidlaw, F. W. Poliomyelitis in state of New York in 1931, preliminary report of study of 1,559 cases. *J.A.M.A.*, 99: 1053, 1932.

Orthopedic Aspect of the Los Angeles County 1934 Poliomyelitis Epidemic*

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WITH each succeeding epidemic of poliomyelitis the orthopedic aspect of the acute stage of this disease gains wider recognition and becomes more keenly appreciated. Let us hope that the day is gone forever when the practitioner and the relatives wait until the patient is paralyzed and deformed before seeking orthopedic consultation. Early consultation has, we are thankful to say, enabled the orthopedist to direct his major efforts toward prevention of deformities rather than toward reconstruction. During this epidemic the department of contagious diseases and the orthopedic department have combined their facilities—a great advantage to all concerned, especially to the patient.

DIAGNOSIS

The diagnosis of early muscle involvement has at times been difficult. During this epidemic the type of onset has been extremely variable, especially among adults. In a good proportion of cases, the onset has been, instead of sudden, extremely insidious, taking as much as 6 or 8 weeks in some instances to reach the peak of muscle involvement. Patients often walked about for days and even weeks with vague sensory disturbances, and muscle weakness be-

fore becoming sufficiently disabled or alarmed to seek medical advice. An easily fatigued leg or arm was frequently the only reason for seeking a physician. No doubt a large number of cases were missed. Patients are questioned routinely regarding the presence of painful, tender, weak, and easily fatigued extremities. The physical examination always includes palpation of accessible muscles for the presence of tenderness. If little or no muscle tenderness is noted, the strength of each muscle or muscle group is checked. We have, in the presence of more than slight tenderness, consistently followed the policy of deferring the muscle check. It was soon observed that this was an entirely logical policy. Checking muscle strength in the presence of moderate or marked tenderness is not only inaccurate but will often result in an accentuation of the tenderness.

Scores of conditions have been incorrectly diagnosed as poliomyelitis. The superficial and deep tenderness, and the arthritic manifestations of poliomyelitis must be differentiated from such conditions as acute rheumatic fever, early meningitis, acute infectious arthritis, influenza, acute osteomyelitis, acute myositis, acute bursitis, and many others. Muscular exertion by an individual leading a sedentary life may cause muscle tenderness closely resembling that due to poliomyelitis. In checking for muscle weakness the examiner must

* Read before the Health Officers Section of the American Public Health Association at the Sixty-third Annual Meeting in Pasadena, Calif., September 3, 1934.

† Deceased July 14, 1934.

not be misled by weakness resulting from such conditions as an old fracture, healed deep lacerations, chronic osteomyelitis, chronic arthritis, etc.

ORTHOPEDIC TREATMENT

When a patient is considered to be in the pre-paralytic stage of poliomyelitis he is observed closely for the onset of muscle tenderness or weakness. At the first signs of either sensory disturbances or weakness in an extremity, that extremity is splinted and the patient is placed on a hard bed. If the tenderness becomes marked and generalized, as it so often has, the patient is placed on a Bradford frame. Individual arm and leg splints are applied; the arm splints are bolted to the frame. The extremities and other parts of the body are splinted in a position of physiological rest, a slight advantage being given to some of the more important and more commonly involved muscles. The foot is dorsi-flexed 80° and slightly inverted, the knee is flexed 5° to 10° ; the thigh is flexed 10° to 15° ; the extremity is abducted 15° and externally rotated 10° . A small pad or pillow is placed beneath the lumbar and lower dorsal spine; its size is varied for comfort. The arms are abducted 75° and brought 30° to 40° anterior to the frontal plane of the body. The forearm is placed in 45° of supination and flexed 75° . The wrist is extended 15° , the fingers slightly flexed, and the thumb slightly adducted. If regular splints are not available immediately after muscle tenderness or weakness is observed temporary splints are fashioned from pillows and sandbags, and when properly applied and watched are satisfactory and comfortable. In certain mild cases they are all that are ever necessary. Few casts are used during the acute and sub-acute stages, but at times they are indispensable. They are used mainly on babies, small children, and uncoöperative adults (particularly doc-

tors and nurses). Casts are bivalved when dry and the top half usually discarded. The muscles and joints are palpated regularly to determine the status of the sensory changes. When muscle tenderness has practically or entirely subsided a gentle muscle check is done. If paresis or paralysis is present the impaired muscles are, if possible, splinted in a position of complete relaxation; for examples, in deltoid paralysis the arm is abducted 90° , in anterior tibial impairment the foot is dorsi-flexed 90° and inverted.

ANOMALOUS FORMS

The children have usually had a typical form of poliomyelitis, which has, in all but a few cases, been mild. Among the adults there has been a large number of bizarre and anomalous forms. A typical case of poliomyelitis in an adult has been the exception; many cases appeared to be the polyneuritic type. It is not exaggerating to say that among these older patients almost every conceivable type of sensory disturbance has been observed, and many times in the absence of definite motor paralysis. Spontaneous excruciating pain has been one of the severest manifestations. The character of the pain has been widely variable. Sometimes it is dull and boring, at other times sharp and radiating; a paroxysmal causalgic type of pain has also been frequent. Prolonged periods of muscle spasm have often been the source of severe pain; rarely excruciating spontaneous clonic contractions have occurred in lower extremities. Any physical or emotional disturbance frequently causes immediate or delayed accentuation of the pain.

Joints have been one of the most frequent and perturbing sources of pain. In many instances the joints have become exquisitely tender, swollen, and intolerant of the slightest motion. The skin over the involved joints never becomes discolored. An increase in

synovial fluid is occasionally observed, especially in the knee joint. The joints most commonly involved are ankles, knees, shoulders, elbows, and wrists. Intermingled with the various pains are all sorts of disagreeable sensations such as fibrillary twitchings, dysesthesias and paresthesias. Deep tenderness is the commonest sensory disturbance; it is most marked and prolonged at the musculo-tendinous junctions. Hyperesthesia is the next most common sensory change; it is often so intense that the patient resents even the touch of a sheet. Areas of anesthesia have been less common. One patient at present has anesthesia involving all of both forearms, with complete paralysis of both forearms. A partial or total loss of proprioceptive sense is occasionally observed in one or more extremities. Considerable tenderness is frequently observed along the nerve trunks, especially the radial, ulnar, and sciatic. Motor impairment has been as variable and bizarre as the sensory changes. There is no relation between the degree and extent of the paralysis, and the severity of the sensory disturbance. With the exception of a few cases, the motor impairment has been mild and of short duration. Many patients were found to have practically normal strength at the time when the sensory changes first subsided sufficiently to permit a muscle check.

Vasomotor and trophic changes have occurred in varying degrees in the majority of cases. The extremities become cold cyanotic, and occasionally edematous; sometimes they are moist, sometimes dry. In the more severe cases the skin desquamates and is left thin, glossy, and often red. Hypertrichosis occurs in nearly every case. The nails usually become brittle and grow faster, except in the severe cases where they temporarily cease growing. A few adults, chiefly nurses, who had their onset more than 3

months ago still have nerve trunk tenderness and generalized sensory disturbances; also painful and exquisitely tender joints that resist attempts to obtain motion in them. These cases with a clinical picture of cord changes combined with various degrees of peripheral neuritis are suggestive of infectious neuronitis.

EXACERBATIONS

One of the most interesting characteristics of many adults, especially women, is the occasional recurrence or exacerbation of certain signs and symptoms. Several conditions appear to precipitate these "flare-ups": Anger, fear, hilarity, prolonged severe pain, extreme fatigue, and sudden atmospheric changes. The outstanding symptoms are an increase in superficial and deep tenderness, severe frontal headache, vertigo, diplopia, and, most perplexing of all, vomiting which is frequently prolonged and projectile. These symptoms are almost always associated with a moderate or marked increase in intracranial pressure. A spinal tap has frequently given instantaneous and lasting relief. The duration of symptoms during these periods has varied from 1 day to more than a month. The majority of women patients have at least one such "flare-up." Some have had one after another. The consensus of opinion is that these attacks do not represent an exacerbation of the disease itself, but are more probably due to a vasomotor disturbance or instability.

ORTHOPEDIC TREATMENT (CONT.)

With children pool therapy is usually instituted soon after the quarantine period has passed, provided their general condition is satisfactory. If there is no sign of skin or muscle tenderness a carefully graduated program of muscle training is instituted soon. The utmost care is constantly employed to keep within the boundary of beginning

fatigue. While there is any evidence of superficial and deep tenderness the muscle training is deferred, but the patient is placed in the salt bath or pool and instructed to execute whatever movements he can without pain. Under this type of therapy the tenderness rapidly regresses and disappears in most cases. Pool therapy is a valuable adjunct in the treatment of poliomyelitis. Water, in a most pleasant way relieves the weak or paralyzed muscle of the antagonistic force of gravity. Patients, old and young, enjoy the water, and by it are kept in a healthy mental state, which is no small issue in the treatment of poliomyelitis. Regular short periods of gentle massage preceded and accompanied by infra-red heat, are instituted when tenderness has practically or entirely subsided, and are persisted in as long as there is any evidence of improvement.

New problems have been encountered in the treatment of adult cases. The exquisite superficial and deep tenderness together with the excruciatingly painful joint involvement have in some instances resisted for week upon end every treatment used. The scope of the treatment in these cases has been considerably limited. Because of the intense pain and tenderness and the likelihood of an exacerbation, pool therapy has had to be deferred for many weeks. As soon as they are tolerated warm salt baths are given. Most patients obtain more or less relief, although a few have been made worse. The utmost care should be exercised to avoid fatigue. Besides the baths diathermy or ultra-therm has frequently been used; it is administered over the spine and some of the more painful joints. Many patients experienced definite relief and relaxation from these treatments. In some of the severe cases of long duration joint stiffness has become a perplexing problem. In these, local infra-red heat is applied and when tolerated a program of

carefully graduated and limited passive motion is instituted.

An earnest effort is made to build up and maintain a healthy, happy mental state in every patient. This is not easy because one of the most constant symptoms of the adult form of the disease has been extreme irritability and periods of melancholia. Minds are kept occupied; most patients have radios; games are played by the less sick; and books and magazines are supplied. Thanks to Frances Marion and the late Marie Dressler, motion pictures have been made possible. Once a week a first-run "talkie" is shown for the adults, and a "Juvenile" for the children; these shows are heartily enjoyed.

STATUS OF PARALYSIS

There appears to be no relation between the severity of the onset and the subsequent muscle impairment. Most of the quarantined cases presented evidence at some time during their illness of muscle tenderness and weakness. In the majority of cases the involvement was slight and of short duration. Many patients after having had severe sensory disturbances revealed little or no muscle weakness; certain others had extensive muscle weakness, but of only 4 weeks' or less duration. A small number now after 4 months still have extensive sensory changes and muscle damage. At a later date a chronaxia study and a detailed account of residual muscle impairment will be reported. Among the older patients the upper extremities have been involved nearly as often as the lower. In the lower extremities associated muscles have been more often involved together than antagonists. Upper extremities have been more impaired distally than proximally. Children have seldom had upper extremity paralysis. Of the several hundred General Hospital patients there remain at present only 144 who have muscle involvement of any consequence. Of this

number 24 are males and 120 are females. Thirty-one of the total cases are severe and 113 are mild. The mild cases are expected to recover completely within a few weeks. Of the 31 severe cases there are 17 women, 8 girls, 2 men, and 4 boys. Nine of this group still have more or less generalized sensory disturbances; 22 have no sensory changes but have various degrees of muscle impairment—of these, 12 are adults and 10 are children. In the

adult group it is interesting to note that 6 have their muscle impairment in the left arm and left leg. In 8 of the 10 children the paresis and paralysis is confined to the lower extremities and trunks. Of the 31 severe cases it is not too much to expect that within a year nearly half will have practically normal muscle function. We are thankful to be able to look forward to a residual paralysis rate that will be, in the end, probably less than 2 per cent.

Henry Street Nurses and Tuberculosis Prevention

DR. WILLIAM H. PARK, director of the research laboratories of the City Health Department, F.A.P.H.A., called on the Henry Street Visiting Nurse Service to help carry on the test of vaccination as a preventive for tuberculosis.

In a letter to Miss Marguerite Wales, General Director, he said:

We have already made very encouraging progress toward showing that vaccination can prevent tuberculosis in many cases. We have

not the means, however, to follow beyond the age of 5 years cases which were vaccinated in infancy. Until such provision is made, we will not be able to tell how long the vaccine is effective, whether only for a few years or up to adult life. This information is of great importance.

I know very well the great problem which you face in raising money to carry on your regular work, but I hope in addition that you will be able to obtain the means to follow up these cases. If you do, it will be a very great contribution to the fight to eradicate tuberculosis.

Poliomyelitis in San Francisco^{*}

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IT is not the purpose of this report to summarize completely the epidemic in Northern California. An authoritative summary of the 100 cases occurring in San Francisco has already been prepared by Geiger, Becker, and Gray. This discussion is based on the daily observation of 51 cases admitted to Children's Hospital, San Francisco, during the first 7½ months of 1934. Although the point of view is entirely clinical, this series should present a fairly valid cross-section of the epidemic, about half as many cases being included in it as were reported in San Francisco.

Incidence—During the first 6 months of the year our incidence reflected the increase throughout the state, 1 case being admitted in December, 1933, 1 in January, 1 in February, 2 in March, 1 in April, and 5 in May. A peak of 32 cases was reached in June, and there was a decline to 7 in July and 1 in August. There has been no warning so far of a rise to a secondary peak.

Age—The age distribution of these cases is not conventional. Thirty were below, and 21 above 15 years of age; the oldest was 55. The occurrence of a high incidence in the older age groups, a characteristically rural ratio, is hardly consistent with a possible theory that our relatively low incidence in a polio

year is accounted for by a high degree of immunity among the general population, nor does the fact that a few of our cases were non-local in origin fully account for this ratio.

Sex—In the age group below 15 there is the usual predominance of males in the proportion of 16 to 14, but above this age there were 7 males and 14 females, all 10 of those above 25 being females. Men are freely admitted to the communicable disease department even though only women and children are admitted to the general hospital.

Contacts—Most nurses and members of the house staff received "normal" adult serum for its possible prophylactic value, a dose of 20 c.c. or more being administered every 2 weeks during the epidemic. A rigid technic, including masking, was employed and, contrary to some experience elsewhere, no cases developed among attendants. In the general population adult serum was similarly employed to some extent and we had no cases in which this had been previously administered.

Three of the 51 cases followed known contact with the disease and 1 of these justifies especial comment. A 6 year old girl was admitted to the hospital June 13, 1934, on the 5th day of illness, promptly succumbing to bulbar poliomyelitis. Her 4 year old sister, in intimate contact until her admission, was under observation at this time for 2 days, and was given 15 c.c. of con-

^{*} Read before the Health Officers Section of the American Public Health Association at the Sixty-third Annual Meeting in Pasadena, Calif., September 3, 1934.

valescent serum from a serum pool of the Hooper Foundation. This contact developed no symptoms until 17 days after her last exposure and was then admitted with fever and signs of an upper respiratory infection. For 24 hours she apparently improved, her temperature dropped, then she became tremulous, her temperature steadily rose, and 48 hours after admission poliomyelitis was diagnosed. Lumbar puncture revealed 83 cells. Dysphagia and altered speech were evident in a few hours. She steadily and fairly promptly recovered after the administration of 2 successive daily doses of 50 and 25 c.c. of immune sheep serum. This failure of protection will be discussed later.

On the day this patient was admitted a puppy, secured after the death of the first case, became ill, developed strabismus and paralysis of the hind legs, was killed and incinerated before the parents thought of mentioning the matter.

Diagnosis—The symptomatology was entirely conventional, headache, fever, malaise, extreme fatigability, muscle pain, being common complaints. Neck stiffness was the most important physical finding in the pre-paralytic stage with tremulousness next in importance.

The spinal fluid very rarely showed any increased pressure. There was nearly always an increase in cells although 10 of the cases showed cell counts of respectively 1, 1, 3, 5, 8, 9, 11, 15, 17, and 24. In 1 of these puncture was performed only after paralysis was well established; 1 was in a severe bulbar case; 1 had a cell count of only 1 at the onset of spinal and bulbar paralysis; 1, showing 24 cells, had unmistakable symptoms following contact with a brother, ran a rather severe course and recovered entirely. In 5 cases the diagnosis was substantiated only by characteristic pre-paralytic symptomatology.

Suspects—Along with those diagnosed poliomyelitis 55 suspects were admitted

for study, in most of whom pathology not due to poliomyelitis virus was readily demonstrable. The symptoms which occasioned admission were most commonly due to respiratory infection. There were 22 patients in which tonsillitis, otitis, adenitis, bronchitis, pneumonia or influenza-like upper respiratory infection accounted for conflicting symptoms. There were 2 cases of measles and 3 of exanthem subitum. Among the suspects was 1 case of typhoid, 1 of erythema nodosum, and 1 presenting the clinical features of mild dengue, although we were reluctant to make this diagnosis in the absence of proof of a possible vector. Five patients, 3 of whom were contacts, revealed no sign of any disease. Three patients had symptoms dependent on trauma, 1 entered during an epileptic seizure, 1 during an episode of migraine, and 1 during a reaction to tetanus antitoxin.

The most interesting diagnostic problem was afforded by other types of central nervous system infection. There has been during the last several months an unusual incidence of mumps meningo-encephalitis, the authors having seen 8 cases. Four of these were among the cases admitted for observation in this series, the diagnosis being indicated by the accompanying parotitis, the lymphocytic fluid, and the course. One case of poliomyelitis developed mumps without neurological complications early in his convalescence from the former disease. One case admitted as poliomyelitis was diagnosed epidemic encephalitis, the diagnosis being borne out by the protracted course and typical findings. Three cases in the series had headache and indefinite meningeal signs along with mild dysentery.

If it is true that poliomyelitis epidemics are accompanied by innumerable sub-clinical cases of the disease, it is surprising that at a time when popular apprehension and medical alertness

were attuned to investigate the slightest symptoms, in only 6 of the 55 admissions for observation were we unable, in the presence of some evidence of illness, completely to rule out sub-clinical poliomyelitis or make a positive alternative diagnosis. If the present epidemic was accompanied by many sub-clinical cases most of these must have been entirely asymptomatic.

It has been a common observation that epidemics of poliomyelitis occur during periods when other epidemic diseases are not present. In contrast to this, the present epidemic occurred during the wane of measles incidence and when there was coincidentally a great deal of respiratory infection and other forms of acute illness. The differential diagnosis of influenza-like upper respiratory infections with headache and generalized pain, measles, and other of the acute infections mentioned, from poliomyelitis was a difficult problem particularly because of the occurrence of mild cases of poliomyelitis and of a very few with normal or nearly normal spinal fluids.

Treatment—In the treatment of these cases we have proceeded on the belief that convalescent serum, the serum of immunized animals, or the transfusion of large amounts of normal (and potentially immune) blood offers a legitimate hope of specific therapeutic effect. Our eagerness to employ these measures definitely encourages the beneficent by-effect of early observation with the consequent employment of prolonged rest and the early use of orthopedic measures.

Our present and past cases are insufficient to permit statistical conclusions regarding the efficacy of treatment, and we have always avoided drawing arithmetical comparisons as an index to therapeutic effect. The propriety of basing an opinion upon the purely numerical end results in treated and untreated cases may be questioned for

several reasons. It is, of course, obviously incorrect to treat all early cases and use those admitted late as "untreated controls." Conversely, if alternate cases are selected for treatment, the results in treated and untreated cases can be compared only if similar conditions prevail throughout the series.

It is difficult to conduct a clinical experiment along the lines pursued in the laboratory even if one were temperamentally able to resist the tendency consciously or unconsciously to select one's cases. In the laboratory, controls are employed for each variable in an experiment, but it is impossible to provide adequate controls for the innumerable variables which exist in this clinical experiment. These experimental variables affect the patient, the disease, and the therapeutic serum.

Patients manifest different responses to the disease and at the same time to the effect of therapy because of age, size, individual variations in immunity, and because of alterations in the immunity of the individual occasioned by fatigue, physical changes, the influence of other infections, etc.

Variations in the infection occur with respect to individual epidemics, season, location, and the changes in virulence which accompany the rise and fall of an epidemic. The effect of variations in the dosage of the infecting virus, dependent on the duration and intimacy of exposure, is commonly not considered although the influence of this factor on the intensity of disease may be clearly seen in other childhood infections.

Convalescent serum obviously falls far short of the antibody content of therapeutic serums employed in other diseases. It is difficult to evaluate quantitatively the antibody content of any antiviral serum, but there must be a tremendous variation among those used in poliomyelitis. All types of serum are employed in therapy, moreover, in various amounts. A proper

quantitative relationship between the age, size, and response of the patient to the severity, localization and stage of the infection, and the amount and "titer" of a therapeutic serum which must be employed to constitute effective therapy is yet to be established. This has been done in other infections in which specific therapy is successfully employed; without such a scheme of treatment it might be difficult to evaluate statistically the effect even of antitoxin in diphtheria.

The real problem, as yet unsolved, is whether or not any patient with poliomyelitis can be benefitted at any stage by any amount of serum. We have tried to meet this problem by treating cases at the earliest possible moment with large doses of serum repeated at very frequent intervals, and in the case of a convalescent serum varying the source. The view that the serum has effective properties is somewhat discouraged by the incident quoted earlier in which the disease followed exposure despite the prophylactic administration of 15 c.c. of convalescent serum. Such occurrences, however, are not uncommonly encountered in the prophylaxis of measles with convalescent serum and although they are equally hard to explain they are insufficient to discredit the fact that measles convalescent serum usually protects against this disease. Measles prophylaxis presents other points of similarity which might be mentioned inasmuch as it is here also necessary to regard quantitative relationships between age, size, degree of exposure, elapsed time after exposure, and dose of serum. The possibility that in poliomyelitis, as in measles, modification of the disease by serum rather than complete ablation of all symptoms may be brought about, must be borne in mind, and the observations over the last 10 years encourage us in this belief.

Outcome—The course of the cases in the present epidemic favors the opinion

that convalescent serum is a beneficial factor although obviously it was not the sole factor influencing a favorable or unfavorable outcome. In some cases prompt improvement followed serum therapy and the whole infectious picture presented by the patient was markedly altered. This effect was seen particularly in patients with high spinal fluid cell counts and typical symptomatology in which over a period of 2 to 5 days prior to treatment there was little change in either direction. In a number of these the improvement following serum was so prompt both subjectively and objectively that the influence of therapy was almost unquestionable. In other cases there was a slower subsidence of symptoms but the end result seemed materially better than could reasonably have been predicted, granting the difficulty of such predictions. Only rarely were end results unfavorable and in these it was impossible to be sure that adequate antibodies were applied sufficiently early.

In this series there were 17 cases which were treated preparalytically in which both clinical and laboratory evidence clearly substantiate the diagnosis. In 15 of these, following intensive serum treatment there developed only very slight and transient paralytic phenomena which had completely cleared by the end of the 3 weeks of isolation. These favorable cases include a few regarding which we were optimistic from the outset, a number in which the outcome was characteristically unpredictable, and several in which the symptoms were so severe as to justify a very unfavorable prognosis. In 2 the results were unfavorable, 1 represents a failure of what we regarded as adequate therapy, the other was treated, we feel, inadequately for 3 days before entering the hospital badly paralyzed and still in the febrile stage.

In all of the cases which entered the hospital after paralysis was evident but

in which active symptoms of infection still persisted, specific therapy was applied. In these cases it is impossible to arrive at more than an impression regarding beneficial effects, but this impression is that a certain amount of modification of the disease was brought about by specific therapy. Such a therapeutic result may be compared

with that effected by the transfusion of large amounts of immune blood during the febrile course of measles. An especially favorable effect was observed in bulbar cases in which paralytic symptoms commonly appear almost coincidental with the initial rise in temperature and in which a grave prognosis is usually justified.

Borough of Willesden, England

THE 1933 annual health report of the Borough of Willesden, England, reveals many interesting health activities. The estimated population for mid-summer 1933 was 190,875, the area 4,384 acres, giving an average of 43.3 persons per acre. The general death rate was 9.88 against a birth rate of 13.99.

The infant mortality of 46.05 per 1,000 births was the lowest rate ever recorded for Willesden. About 36 per cent of expectant mothers attended prenatal clinics conducted by the health department, while 46 per cent of the births took place in hospitals. Midwives are directly under the supervision of the health department, being trained in the Maternity Hospital. There were 13 cases of puerperal fever, 4.7 cases per 1,000 total births; 4 of the cases were fatal. Each case of puerperal fever and each death occurring in childbirth are investigated by a consulting obstetrician. The Maternity and Municipal hospitals are under health department supervision.

There were 392 cases of diphtheria,

11 deaths; 1 of smallpox, no deaths; 13 of typhoid fever, 1 death. Four small outbreaks of food poisoning were investigated; the largest of these, affecting 23 persons and causing one death, was attributed to staphylococcus aureus by the Pathological Laboratory of the Ministry of Health.

To combat the increasing death rate from cancer, bi-monthly clinics are held at each of two centers, for the purpose of diagnosis. In addition arrangements are made with certain large London hospitals for referring patients for further diagnosis and for treatment.

Children are examined and attempts are made to correct defects in the secondary and trade schools, as well as in the elementary schools. Much dental work is done for children from infancy until they finish elementary schooling, and for expectant and nursing mothers. At four feeding centers in the city, breakfasts and dinners are provided to school children of unusually poor parents. Children who pay may also obtain hot dinners at these stations.

Western Public Health Problems*

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TODAY in connection with our parent organization we open our Fifth Annual Meeting since the birth of the Western Public Health Association in 1930. There is no doubt whatever that the Western Public Health Association has ably served its purpose of promoting professional intercourse in the western part of the United States, and furthering the interest of the public health of the people. In spite of the fact that the association was launched during the depression, attendance at meetings has been gratifying. The western states not only have the usual problems of public health and sanitation common to the rest of the country, but also problems that, because of our climate and our nearness to the Orient, are of special significance to health officers in this section. It is gratifying to note the splendid support given our organization by the American Public Health Association, and we hope that when financial conditions are better support may be increased.

If the Western Branch is to accomplish its best results, substantial endowments and contributions of money should be secured.

I feel the organization owes a great deal to the time and effort spent by our able secretary, Dr. W. P. Shepard, without whose services the organization

would be seriously handicapped. It is not too much to hope that in the future our organization may look forward to a full-time secretary with at least a modest budget.

There are several urgent problems before western public health officers, a few of which we may mention here. Psittacosis presents a unique problem in public health control. The known facts definitely connect the presence of infected psittacine birds with the spread of this disease to human beings, nevertheless, control measures have been extremely difficult and, unfortunately for California, the disease has caused outbreaks in other sections of the country. This disease illustrates the exposed character of the western states, because there is evidence to show that it was introduced into California from Brazil. Nothing short of extirpation of all infected birds in California will suffice for its eradication. According to U. S. Public Health Officer V. M. Hoge (*Public Health Reports*, 49:451 (Apr. 6), 1934), there is a long list of susceptible species of birds, which includes poultry. This situation in regard to psittacosis serves to emphasize the need for extension of the research resources on the Coast, both from the U. S. Public Health Service and through private support.

Plague continues to be a serious menace not only to California but to the entire coastal area. Recently, in Kern County, Calif., an area of approximately 409 square miles, was found to be heavily infected with plague in ground

* Address of the Retiring President, Western Branch, American Public Health Association, delivered at the Sixty-third Annual Meeting of the American Public Health Association and Fifth Annual Meeting of the Western Branch, in Pasadena, Calif., September 2, 1934.

squirrels. The total area involved, including a portion of Tulare County, is 945 square miles. One infected child was reported in this area, and more human cases would have occurred except that the district is sparsely settled. Plague has been proved, by dissection and laboratory tests, in 162 squirrels (Selvatic Plague, Its Present Status in California, K. F. Meyer, Ph.D., *California and Western Medicine*, 40:407 (June), 1934). Needless to say, the situation is receiving prompt and efficient attention in the eradication of ground squirrels. A proposed state-wide program under S.E.R.A. for an intensive ground squirrel eradication is under consideration.

Other diseases which give us marked concern in the western states are undulant fever, Rocky Mountain spotted fever, tularemia, rabies, and tuberculosis. This list is not an exhaustive one, but these are perhaps the most important.

In regard to tuberculosis, of course, our problem has been one mostly of the importation or migration of cases from other parts of the United States. Nevertheless, with our growing population we can truthfully say that we have a problem of indigenous tuberculosis as well. It is noteworthy that in the last 20 years the tuberculosis death rate in California has been reduced from 198.3 per 100,000 population, to 72.3. It is surely necessary that we greatly extend our efforts in regard to this common communicable disease in the finding of missed cases in the search for contacts, and in proper hospitalization and isolation of infective persons.

I need scarcely remind this audience of the discovery by McCoy in 1911 of tularemia in Tulare County, and the fact that this disease is quite widespread throughout this area. Coccidiodal Granuloma was also discovered in California by Rexford in 1894; and Ophüls and Ash in 1905 discovered the oidium

coccidiodes, the general source being located in the San Joaquin Valley.

It is interesting to note that the first reported death from rabies in California occurred in 1892 from a skunk bite. We must admit with shame that rabies is still very prevalent, and that adequate measures for its eradication have not received public support. Recently in San Diego a young girl died from this disease, and last year one death occurred in Los Angeles County.

Since the work of Dr. Charles Browning, of Highlands, on the black widow spider (*latrodectus mactans*) in 1901, additional research by Bogen and Berman of Los Angeles County has revealed this spider as a serious menace and the cause of quite a few deaths, the true origin of which had probably been overlooked.

The menace of botulism, as a result of the pioneer work of Wilbur and Ophüls, followed by Dixon, Geiger, and Karl Meyer, has been very much lessened. Nevertheless, we must constantly be on guard in supervision of canning, particularly of home methods. It is rare indeed that any case of botulism is traced to commercial canning, so effective have been protective measures. We must continue to insist to the public that *all home canned vegetables and other non-acid foods should be thoroughly boiled before use*. Any canned product which has a leaky lid or an "off odor" should be treated with suspicion and, above all, no householder should even taste any suspected products.

The early work of Kellogg and Kilyoun with plague in 1894 may be recalled to your minds. The struggles during that early period with the politicians should give us some sense of gratification when we consider the prompt response of states and municipalities to our requests for aid in the presence of this menace today. The influence of Rupert Blue in those early

days has been felt throughout the state to the present time. We must admit, however, that there is much progress yet to be made in some of our large cities which are derelict in not providing proper rat-proofing of buildings and other measures.

Diphtheria antitoxin was first used in Los Angeles City in 1895. Los Angeles City was also one of the first, if not the first, to establish a municipal nursing system, which it did in 1898.

Smallpox is still a menace in our western states, especially in California, because of the peculiar resistance we meet from the cultists. This situation is worthy of some analysis. It appears historically that cultism and irregular practitioners of medicine have been a problem in California and perhaps in all of the western states since the earliest days. Although California was the third state of the Union to establish a State Board of Health, having done so on March 8, 1870, nevertheless, the struggle against quackery began early and still continues, and is mostly unsuccessful. The first Medical Practice Act in the State of California was established in 1876, and included not only the regular M.D.'s but homeopathy and eclecticism. The first secretary of the State Board of Health, Thomas M. Logan, made many notable advances, and was a man of great energy and ability. He was also the first resident of California to be president of the American Medical Association.

It is interesting to note that in 1885 the total number of certificates issued by the Board of Examiners of the California State Medical Society was 1,698; the number issued by the homeopathic boards, 217; by the eclectic board, 294; total, 2,209; the number of persons practising medicine without a license was 425. The proportion of population to each licentiate was 1 to 838. In 1925 after the passage of the chiropractic initiative in 1923, an estimate made

by Musgrave (*California & Western Medicine*, 23:598 (May), 1925) calculated that there was one doctor of some sort operating to each 100 population—about 31,000 altogether. Of these, only 8,000 held physicians' and surgeons' licenses. The author admits that the licensing system has not protected the public from cults and quackery.

A recent survey made in Los Angeles County by myself gives the following figures: total practitioners of all kinds, 7,636; regular M.D.'s, 3,918; osteopaths 927; chiropractors 1,440; optometrists 550; Christian Science practitioners 1,200; naturopaths and midwives 101. It is significant that the 1,440 chiropractors have come into being since 1921. Throughout the United States it is estimated that \$125,000,000—a sum equal to the entire amount spent on public health—goes to the irregular group of persons practising medicine. I have estimated that if the amount spent for patent medicines and quackery could be entirely eliminated, the income of each regular medical man in Los Angeles County would be increased annually between \$3,000 and \$5,000. A recent book by a newspaper writer, Morro Mayo, states as follows: (Los Angeles, by Morro Mayo, Knapf & Co., 1933, p. 269):

In addition to its preëminence in the fields of material progress, morality, and patriotism, it is universally recognized that Los Angeles leads the world in the advancement and practice of all the healing sciences, except perhaps medicine and surgery. Eastern medical science having failed either to rejuvenate the members of that multitude of the aged which each year escapes from harsh winter, or to perform magic for the accompanying army of the sick, many of these people gravitate naturally to the practitioners of divine healing, fortune-telling, and miracle-making, all of which are legalized professions in Los Angeles. The City of the Angels has more osteopaths than any city in the world, and in proportion to its own estimate of population three times as many chiropractors as any other municipality on earth.

The city is internationally famous for its metaphysical versatility, and each year erstwhile Christians in alarming numbers desert the orthodox evangelical churches for temples more bizarre. It is largely, perhaps, a climatic phenomenon. After the frozen folk of Vermont and Wisconsin have been exposed to the melting atmosphere of Southern California for ninety days, a subtle change comes over them. Thereafter they demand something more exotic, if not more erotic, than the frigid stuff to which they have been accustomed. This accounts for all the theological love-cults and spiritual schools of sex aberration. Briefly, it may be set down that any geomancer, soothsayer, holy jumper, herb-doctor, whirling dervish, snake-charmer, medicaster, table turner, or Evil Eye—practising any form of black magic, demonology, joint-jerking, witchcraft, thaumaturgy, spirit-rapping, back-rubbing, physical torture, or dietetical novelty—any such will find assured success and prosperity in Los Angeles despite fierce competition. All kinds of quacks, therefore, have poured into Los Angeles and Southern California for the last twenty years.

The greatest of these, one of the most remarkable women on earth, was, and is, the Reverend Aimée Semple McPherson.

California particularly has been more or less held up to the United States as the home of quackery. A brief examination shows, however, that California has been much sinned against. Osteopathy is an importation from Kirksville, Mo., this school having been originated there in 1896 by Andrew Still. Andrew Still himself places the date as June 22, 1874. The Pacific College of Osteopathy was started in Los Angeles in 1896. For this contribution we have Missouri to thank. The next group, which is now the largest—chiropractic—is an importation from Davenport, Ia. There, in 1894, B. J. Palmer brought to the light of the world the discovery that the nerves which emerge from the spinal column become pinched through twists and defects of various kinds, and therefore cause all kinds of diseases. We have Concord, N. H., to thank for the development of Christian Science. It is interesting to note that as early as 1884 the California Metaphysical Institute

was started by emissaries of Mary Baker Eddy. New York contributes the Theosophical Society, and Katherine Tingley founded the Point Loma Society in San Diego in 1875. Kansas City, Mo., contributes naturopathy, nudism, Unity, and chirothesia. Our most shining example locally of faith healing, hypnotism, mesmerism, and publicity in general, comes from Ontario, Canada—our unparalleled Aimée Semple McPherson. To San Francisco we look for Brother Abrams, now departed, with his box, oscilloclast, and other doo-dads.

The exact origin of the anti-vivisectionists I have been unable to locate. It is noted, however, as early as 1896 an organization appeared in Massachusetts. We therefore might voice the suspicion that this state contributed the pest of anti-vivisection to the West. It may be truly said that Bernarr MacFadden has created a school of physical cultists who, by reason of their opposition to our organized public health procedures, have multiplied our difficulties. To New York we may give credit for the development of this source of our difficulties. Therefore, while it may be true that cultism, possibly because of our climatic and other conditions, flourishes nobly on the Pacific Slope, we may justly claim they are importations, and not indigenous. In many respects we would be much better off with our Indian medicine men, who at least knew nothing about high pressure salesmanship.

During the course of the year your president submitted to a number of prominent public health authorities throughout the United States, and to officials of the American Public Health Association, a proposal of the Los Angeles County Medical Association in which definite demands were made to delimit sharply the work of the public health officer. These data were compiled, copies made and bound and made available to members of our Western Public Health Association. Much

favorable comment has been received as a result of this survey of opinion. A few copies are still available, through the author, for those who wish them.

Briefly speaking, there is no doubt that certain elements among our medical fraternity are desirous of eliminating all treatment of any kind from the program of health departments, even including the giving of advice on formulas and diets in our well-baby conferences. Health education is to be limited to the masses, and not to be given to individuals. Physical examinations are to be confined to those suspected of tuberculosis and venereal diseases, but no treatment whatever is to be given. The X-ray must be turned over to welfare departments. Health camps and preventoria are to be administered by welfare departments and not health departments. Vaccination and immunization must be done, except during epidemics, by private physicians, and fees paid therefor by the health department. Public health nurses must not call on any family of patients being cared for by private physicians except with their consent. As a result of this movement, the State of California now has a clinic bill which, except for the protest of myself and the school physicians, would have placed under a license system even the routine work of the health officer in prevention. A formal charge has been lodged against the health officer that public health work tends to encourage pauperization, and that the medical work of the health department should be entirely limited to those who are certified as indigents by the welfare department.

Time does not permit a complete analysis of these problems. The American Public Health Association at its meeting in Indianapolis adopted an official declaration of attitude on the basic health services of health departments. This declaration stated that leadership and responsibility should be

vested in full-time trained health officers appointed by professional qualifications, and reiterated that the annual appropriation for official health work should be at least \$1 per capita.

In tuberculosis control, the X-ray was an absolute essential for diagnosis and checking of progress. In the handling of venereal diseases the clinic was recognized as a necessity. In the promotion of child health, provision for prenatal care, infant welfare, preschool and school hygiene were stressed. Duplication between school health services and public health services is to be avoided. The demonstration of sound methods in child hygiene and the provision of personal services were approved, especially where these services could not otherwise be obtained. Public health education, both through mass efforts and personal and group demonstrations, was approved. Research work in all lines of public health work was stressed. It was noted that the health officer should participate in the planning and coordination of all health activities in his community. Health conferences, or preventive health center medical services, were justified as a means of creating a demand for such services, as an agency for inaugurating proper standards, and to supplement the preventive services of private practitioners. Diagnostic facilities and clinical treatment for communicable diseases, and individual instruction in personal hygiene through medical conferences and visits by public health nurses should be provided by health departments for all persons needing such services and not in a position to obtain them, under conditions which make their general utilization reasonably probable. In deciding whether a given health procedure should be conducted by the department itself or by individual medical practitioners or other agencies, the primary consideration should be the welfare of the community, and where

efficiency and economy are reasonably equal preference should be given to a program which decentralizes health procedure so as to enlist the private practitioner in carrying them out.

In the organization and make-up of the Los Angeles County Health Department there are 25 full-time medical officers, and 52 part-time medical men. Thus there are more than twice as many men employed by the health department who are also in private medical work than there are full-time men.

In regard to the program of immunization against diphtheria and smallpox, we immunized against diphtheria last year 16,929 persons with a cost of \$.41 per person. We immunized against smallpox 19,655 persons at an average cost of \$.23 per per-

son. We spent \$3,000 on a program wherein 16 nurses visited 18,000 homes and endeavored to send the children to the private physician for immunization. Only 500 immunizations resulted, which makes the cost \$6 per immunization. I therefore question whether as a matter of economics the average health officer can afford to adopt the Detroit Plan of paying \$2.50 per person for immunization which can be performed by the department for from \$.25 to \$.50 per person. Economics to a large degree will answer this question.

In closing, may I express my appreciation for the honor which has been bestowed upon me, and may I express the hope that the Western Branch of the A.P.H.A. will have a splendid and rapid growth in the future.

National Recreation Congress

BRINGING together the strands of many national and local movements for the enrichment of American life, the Twentieth National Recreation Congress, held in Washington, D. C., October 1-5, 1934, presented as complete a picture as this generation has had of the progress and problems of public recreation in the United States. There were 24 section meetings, 4 symposia, and 8 general sessions. The 900 delegates attending considered the swiftly declining birth rate, the plight of thousands of young people out of school and college and unwanted in industry, the idleness of the millions of older un-

employed, changing interests of Americans in their leisure, shrinking appropriations for recreation, and other questions.

Significant of the federal government's new aggressiveness in developing the nation's recreational resources, and particularly its lands, were the reports made by representatives of the National Park Service, National Forest Service, Office of Education, The Children's Bureau, the Agricultural Extension Service, the Federal Emergency Relief Corporation, the Subsistence Homestead Corporation, the Tennessee Valley Authority, the Biological Survey, and the National Resources Board.

Secondary Cases of Certain Communicable Diseases Among Non-Immune Family Contacts

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IN order to determine the relative infectivity of scarlet fever, mumps, chicken pox, whooping cough, and measles, a study was made from data for 1930, 1931, and 1932, secured in Berkeley, Calif. The number of secondary cases among susceptible family contacts was obtained and the secondary attack rate per 100 of these contacts was computed. The observations were made from epidemiological histories of 105 cases of scarlet fever, 1,716 of mumps, 1,456 of chicken pox, 1,043 of whooping cough, and 2,344 of measles, all of which had been reported to the city health department.

The following definitions are used in this study:

Primary case—The first case appearing in a family. When 2 cases appeared simultaneously or when 1 followed the other before the expiration of the minimum incubation period only the first case was listed as primary with susceptible contacts, the second being classified as primary cases with no susceptible contacts.

Susceptible contact—Any person in the family group who did not give a history of a previous attack of the disease. In this study it was impossible to separate the susceptible children and susceptible adults. For this reason the group of susceptible contacts may be fictitiously large as some of the adults

may have had a previous attack which was forgotten. However, the histories were all taken by trained public health nurses and every effort was made to obtain accurate information.

Secondary case—Any member of the family group developing the disease after the expiration of the minimum incubation period, dating from the onset of the primary case.

Secondary attack rate—The percentage of susceptible family contacts that developed the disease.

The secondary attack rates for the 5 diseases studied are shown in Table I. They bear out the generally accepted idea that scarlet fever (secondary attack rate 6.0) is relatively less communicable than the other common communicable diseases,¹ that measles (50.5) is highly communicable, and that the communicability of mumps (26.9) chicken pox (38.8), and whooping cough (40.9), falls between the 2 extremes.²

The secondary attack rate of measles is more than 8 times that of scarlet fever, in spite of the fact that approximately twice as many susceptible persons were exposed per primary case in scarlet fever as in measles, the ratios being 3.1 and 1.6 respectively.

The secondary attack rate of 50.5 for measles is somewhat lower than that found by other observers. This is

TABLE I
ATTACK RATES AMONG SUSCEPTIBLE FAMILY CONTACTS
SCARLET FEVER, MUMPS, CHICKEN POX, WHOOPING COUGH AND MEASLES

	Total number cases	Primary cases no susceptible contacts	Primary cases with susceptible contacts	Number of susceptible contacts	Number of secondary cases	Secondary attack rate
Scarlet fever	105	9	81	250	15	6.0
Mumps	1,716	433	806	1,770	477	26.9
Chicken pox	1,456	447	572	1,126	437	38.8
Whooping cough	1,043	344	402	726	297	40.9
Measles	2,344	909	800	1,258	635	50.5

probably because of the difference in the age composition of the groups studied and because only those cases developing after the minimum incubation period were used in computing our rates. Chapin³ found a secondary attack rate of 76.2 among 8,300 susceptible persons exposed to 8,043 primary cases. However, he included among his secondary cases every case in the family except the first, even those developing on the same day with the primary case. If the 1,723 cases developing during the first 7 days of illness of the primary case are excluded from Chapin's series the secondary attack rate is 65.1, not

greatly in excess of that found in this study. The rate of 53.3 found by Halliday⁴ is based on a study of 120 susceptible contacts living in tenements in Glasgow under such conditions that "from the epidemiological standpoint, each tenement building described may almost be regarded as a household in itself." Of the 120 susceptibles 64 developed measles but in this number were 13 primary cases. If the primary cases are subtracted it leaves 107 susceptibles, 51 of which developed the disease, a secondary attack rate of 47.7, slightly lower than that found by us. Butler⁵ found that of 3,039 susceptibles

TABLE II
COMPARISON OF ATTACK RATES AMONG SUSCEPTIBLES
MEASLES

	Chapin		Halliday		Butler	Kelly and Reite
	Original	Corrected	Original	Corrected		
Susceptible contacts	8,309	8,309	120	107	3,059	1,258
Secondary cases	6,333	4,580	64	51	2,023	635
Secondary attack rate	76.2	55.1	53.3	47.7	66.1	50.5

TABLE III
ATTACK RATES AMONG SUSCEPTIBLE CONTACTS IN FAMILIES WITH 1, 2, 3, 4, AND 5 OR MORE SUCH CONTACTS
SCARLET FEVER, MUMPS, CHICKEN POX, WHOOPING COUGH AND MEASLES

SCARLET FEVER, MUMPS, CHICKEN POX, WHOOPING COUGH, AND MEASLES																											
No. Susceptibles in Family	Scarlet Fever						Mumps						Chicken Pox				Whooping Cough						Measles				
	Primary cases	Susceptible contacts	Secondary cases	Secondary attack rate	Primary cases	Secondary attack rate	Primary cases	Susceptible contacts	Secondary cases	Secondary attack rate	Primary cases	Susceptible contacts	Secondary cases	Secondary attack rate	Primary cases	Susceptible contacts	Secondary cases	Secondary attack rate	Primary cases	Susceptible contacts	Secondary cases	Secondary attack rate	Primary cases	Susceptible contacts	Secondary cases	Secondary attack rate	
1	10	10	0	0	290	290	84	29.0	258	122	47.3	206	206	108	52.4	496	496	255	51.4								
2	23	46	0	0	258	516	129	25.0	170	135	39.7	118	236	95	40.2	195	390	184	47.2								
3	20	60	4	6.7	152	456	130	28.5	88	264	38.6	50	150	46	30.7	74	222	109	49.1								
4	17	68	8	11.8	62	248	70	28.2	33	132	39.4	16	64	22	34.4	26	104	60	57.7								
5 or more	11	66	3	4.5	44	260	64	24.6	23	132	19.7	12	70	26	37.1	9	46	27	58.6								

TABLE IV
NUMBER OF SECONDARY CASES PER PRIMARY CASE IN FAMILIES WITH 1, 2, 3, 4, AND 5 OR MORE SUSCEPTIBLE CONTACTS
SCARLET FEVER, MUMPS, CHICKEN POX, WHOOPING COUGH AND MEASLES

SCARLET FEVER, MUMPS, CHICKEN POX, WHOOPING COUGH, MEASLES																		
No. suscep- tibles in family	Scarlet Fever				Mumps				Chicken Pox				Whooping Cough				Measles	
	Primary cases	Secondary cases	Aver. No. cases per prim. case	Aver. No. cases per prim. case	Primary cases	Secondary cases	Aver. No. cases per prim. case	Aver. No. cases per prim. case	Primary cases	Secondary cases	Aver. No. cases per prim. case	Aver. No. cases per prim. case	Primary cases	Secondary cases	Aver. No. cases per prim. case	Aver. No. cases per prim. case	Secondary cases	Primary cases
1	10	0	0	0	290	54	0.28	0.50	258	122	0.47	206	108	0.52	496	255	0.51	0.51
2	23	0	0	0	258	129	0.50	0.85	170	135	0.79	118	95	0.80	195	184	0.94	0.94
3	20	4	0.20	0.20	152	130	0.85	1.12	88	102	1.16	50	46	0.92	74	109	1.50	1.50
4	17	8	0.47	0.47	62	70	1.12	1.45	33	52	1.57	16	22	1.37	26	60	2.30	2.30
5 or more	11	3	0.27	0.27	44	64	1.45	1.45	23	26	1.13	12	26	2.16	9	27	3.00	3.00

exposed in the home, 2,023 developed measles, a secondary attack rate of 66.1. He does not state whether primary cases and only those developing the disease after the minimum incubation period were included among the 2,023 cases. Table II shows the above rates, both the original and those corrected, to correspond as closely as possible to the group studied by us.

In order to determine if the secondary attack rate varied significantly in families with different numbers of susceptible persons, a grouping was made according to whether 1, 2, 3, 4, and 5 or more susceptibles were exposed. The rates were computed for the different diseases by groups and are shown in Table III. While the numbers are not sufficiently large in some of these groups to warrant drawing definite conclusions, it is evident that there is no fixed relationship between the secondary attack rates and the number of susceptible family contacts.

While the secondary attack rates do not increase or decrease regularly according to the number of susceptible contacts, Table IV shows that secondary cases resulting from each primary case shows a steady increase from the 1 susceptible contact group to the 5 or

more groups for each disease except scarlet fever and chicken pox, and in the latter it is true except for the group of 5 or more contacts. The smallest increase was in scarlet fever from 0.20 secondary cases per primary case in the group with 3 susceptible contacts to 0.47 in the group with 4 susceptibles. The greatest increase was in measles from 0.51 secondary cases per primary case in the 1 contact group to 3.0 in the 5 or more.

SUMMARY

1. Measles has the highest infectivity of any of the diseases studied.
2. The secondary attack rates among susceptibles of any of the diseases studied do not vary uniformly according to the number exposed in the family.
3. The average number of secondary cases per primary case increases as the number of susceptible contacts increases, but there is great variation among the different diseases.

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Silicosis*

A Study of 106 Pottery Workers

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PNEUMOCONIOSIS, a "disease due to breathing air containing silica (SiO_2) is characterized anatomically by generalized fibrotic changes and miliary nodulation in both lungs, clinically by shortness of breath, decreased chest expansion, lessened capacity for work, increased susceptibility to tuberculosis,"¹ and roentgenographically by diffuse nodular or confluent pulmonary shadows, increase in peribronchial and hilar densities and decreased excursion of the diaphragm.

INCIDENCE

Hippocrates described the breathing difficulty of metal-diggers. Agricola,² in 1557, wrote: "When the dust is very corrosive it ulcerates the lungs and produces consumption. Hence it is that in the Carpathian Mountains there are women who have married 7 husbands, all of whom this dreadful disease has brought to an early grave." Löhneiss,² in 1690, recorded that "... the dust and stone fall upon the lungs, the men have lung disease, breathe with difficulty, and at last have consumption." Ramazzini³ first described the grating sound produced by cutting the lung tissues of stone and

coal workers early in the 18th century.

Although observed in every industry where silica-laden air is encountered, pneumoconiosis was not scheduled as a compensable occupational disease until 1910 when New Zealand included it under the Workmen's Compensation Act and almost immediately rescinded the action (Sayers²). Interstitial pneumonia, or miners' phthisis, was recognized among the zinc and lead miners of Utah and Nevada in the same year. It had been known in the Transvaal in 1899. Today silicosis ranks with the dermatitides as one of the most important occupational diseases which McCord⁴ aptly has termed "Medicine's Unclaimed Province." It is estimated by Lanza and Vane⁵ that in the United States fully $\frac{1}{2}$ million workers are exposed to silica dust in the chief mining, quarrying, rock-drilling, clay products, and associated manufacturing industries. Pneumatic tools and natural stone grinding wheels have made silicosis world-wide.⁶

An acute form of the disease occurs with symptoms manifested as early as 3 years after initial exposure to mixtures of silica and soap alkalis. Such cases have been described in soap powder grinders and packers by Chapman⁷ and MacDonald,⁷ in scouring powder workers by Kilgore,⁹ in sand blasters by Foord,¹⁰ and others, and in lens grinders by Russell.¹¹ Death usually is from terminal pneumonia or tuberculosis.

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A more gradual development of silicosis was found by Clark¹² in two-thirds of a group of carborundum and carbide workers with average occupation period of 10 years. Lawson, Jackson and Gardner¹³ found 9 of 17 iron miners with exposure of 3 to 8 years, to have died during the following 21 years. The remainder showed rapidly progressing fibrosis. Lanza¹⁴ reported the average age at death of zinc miners in Missouri as 36 years and the life expectancy of iron ore workers as 9.6 years. In 1900 Murray reported an asbestos worker who was the only living survivor of 11 men entering that industry 10 years previously. Asbestos dust enters the lungs as a silicate rather than as the oxide of silica.

Characteristically pneumoconiosis develops insidiously and symptoms are latent. Thus Britton and Head¹⁵ saw a granite worker and a knife grinder each with only 4 months exposure who first developed symptoms 23 and 14 years later respectively.

In a comprehensive review, Pancoast and Pendergrass¹⁶ found fibrosis in 74 per cent of 495 sandstone workers, and in 57 per cent of 208 rock drillers with average exposure of 21 years. Fifteen per cent of those affected had third stage silicosis. Fifteen of 20 cement plant workers exposed over 7 years had slight fibrosis. Orr¹⁶ reported second stage silicosis in a buck-and-wing dancer who for 25 years had scattered sand on the stage before each performance. Mills¹⁸ found advanced fibrosis at autopsy on a man who had worked in an asbestos mine 32 years previously for a short period only. In hard coal miners with average exposure of 11 years, Tattersall¹⁹ found silicosis developing slowly and insidiously. In Welsh coal miners after 20 years' service, Cummins²⁰ found the lungs to contain large amounts of both rock and coal dust. In his experience silicosis appeared long before tuberculosis de-

veloped and coal miners were not very susceptible to the latter. McFarland,²¹ and Russell, *et al.*,²² found silicosis to be almost universal in granite workers (Barre, Vt.) with an unusual susceptibility to tuberculosis after 20 years' exposure. Head and Rosenblum²³ found 3.7 per cent of 500 males admitted consecutively to Cook County Tuberculosis Hospital to have tuberculo-silicosis.

PATHOGENESIS AND PATHOLOGY

The crystalline and amorphous silica compounds (SiO_2) comprising rock crystal, quartz, quartzite, flint and sandstone, are the chief producers of silicosis. Lemon and Higgins²⁴ emphasize the point that more than 10 million particles of silica per cu. ft. of air and a size of less than 10 microns are essential to any appreciable silicosis hazard. As high as 92 million particles have been determined.

Many observers (Belt,²⁵ Lemon and Higgins,²⁴ Russell,²² Mavrogordato,¹⁶ Pancoast and Pendergrass,¹⁶ *et al.*) believe that following inhalation the particles of silica are engulfed by macrophages or "dust cells" which enter and block the lymph spaces. Mavrogordato¹⁶ concludes that silica kills the "dust cells" and dissolves in the alkaline tissue juices forming a poisonous hydrosol-jell ($\text{Si}(\text{OH})_4$). Gye and Kettle²⁶ have shown experimentally that colloidal silica when injected into animals is poisonous. Fibroblastosis is stimulated and a fibrotic nodule is formed about the dead macrophages. The center of the nodule heals and is free from silica; the periphery grows and abounds in silica particles. Confluence of these nodules produces a massive fibrosis in which are found nests of silica with contiguous healed lesions some of which show 1 mm. or less areas of degeneration. Few believe, with Arntzen,²⁶ that the physical characteristics (sharp edges) of the silica

particles are of much importance, although the presence of alkalis, concomitant infections, and rapid breathing undoubtedly predispose to silicosis.

McNally²⁷ reminds us that silica is a normal constituent of the human body but concludes that any lung containing more than 2 mg. of SiO_2 per gm. has had undue exposure to a dusty atmosphere. He found an average of 1.13 mg. of silica per gm. of dry lung in 21 samples from non-silicotic persons and reported from 2.4 to 26.0 mg. of SiO_2 per gm. of dried lung in workers in various dusty trades. Stone and granite cutters showed the higher amounts. Church²⁷ found the ash of potters' lungs to contain 47.78 per cent silica. In a study of 15 tunnel rock drillers and sand blasters and pulverizers, 12 of whom died of pulmonary infections within 9 to 18 months after short exposures, Gardner²⁸ found almost universally (all but one) microscopic but not gross evidence of silicosis. Sixty-one per cent of the bronchial lymph nodes were silicotic. The nodules ranged from 0.3 to 0.4 mm. in diameter as compared with 3.0 to 4.0 mm. sizes found in hard rock and lead miners with many years' exposure. A maximum of 3.1 per cent silica content in the lungs was found.

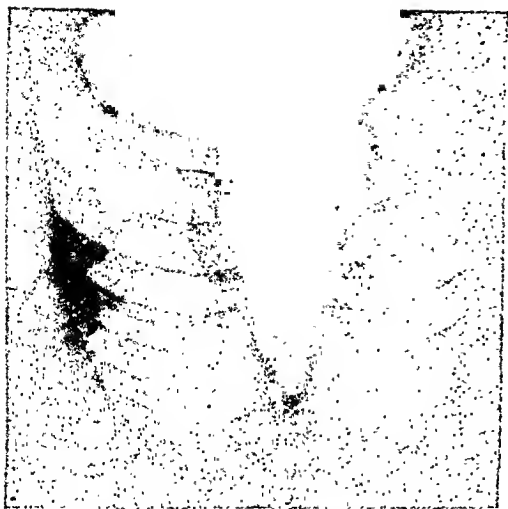
SYMPTOMS

As Russell²² points out, dyspnea, the earliest and the cardinal symptom, first sets in years after initial exposure and is progressive for years after exposure ceases. By the time shortness of breath is complained of, fibrosis already is moderately advanced, diminution in expansion and decrease in fremitus and resonance are demonstrable, and usually there is unproductive cough. Later the harsh breath sounds at the bases of the lungs become almost inaudible. Vital capacity is reduced. Cyanosis may be present. The anteroposterior diameter of the chest may be increased an inch.

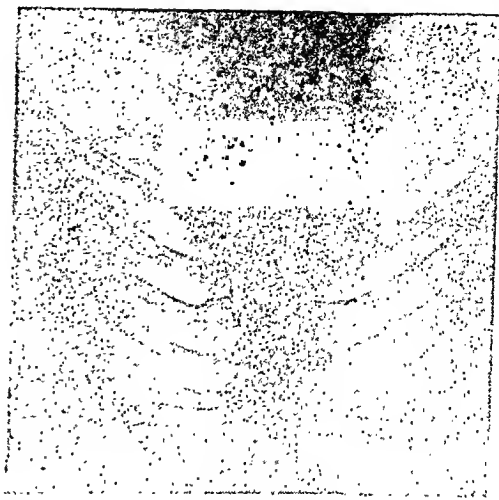
The patient, however, remains well nourished unless tuberculosis complicates the picture.

The earliest roentgenographic findings are increased density of the hilus shadows and trunk branches, perhaps indistinguishable from the changes resulting from repeated respiratory tract infections. A diffuse increase in linear markings follows and in second stage fibrosis nodulation, most pronounced in the central and basal fields, is observed. Confluence of these nodules produces a picture of consolidation in third stage fibrosis in which pleural adhesions also are almost constant. An important prognostic sign is the fluoroscopic observation of limited excursion of the diaphragm.¹⁶

In the differential diagnosis it must be remembered that other dusts than silica, as well as other diseases, produce changes in the structure of the lungs, as pointed out by Pancoast and Pendergrass.²⁹ The writer has observed 1 case of advanced fibrosis of the lungs in a laborer who for 10 years had cleaned soot and lamp black from the stand pipes and gas purifier of a gas plant. The size of the heart shadow and the prompt disappearance of the lung shadows with restored compensation betray the passive congestion of cardiac decompensation and coronary thrombosis. In bronchiectasis the cough is not unproductive, and dilated bronchial shadows are disclosed by roentgenograms. In the asthmatic chest the mottling is accentuated during and immediately after attacks. Metastatic mycotic infections closely simulate the nodular phase of silicosis but isolation of the fungus and the clinical signs clear up the diagnosis. Diagnosis oftentimes will have to depend on post-mortem determination of the silica content of the lung tissues and the presence or absence of the ulceration and progressive destruction characteristic of tuberculosis.³⁰



Case 35—R. S., age 17 years, a caster for 3 years, had negative history and normal physical findings. X-rays (Plate I) revealed only slight peribronchial thickening and increased density in the hilar regions.



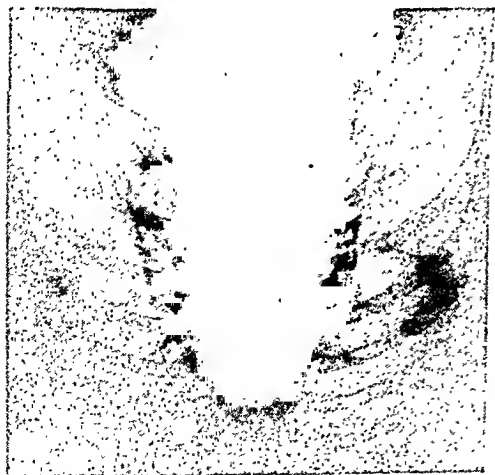
Case 54—M. P., age 32 years, a caster for 6 years, and coal miner for 10 years, had influenza 4 years previously, presented no symptoms and only slightly impaired resonance in the interscapular regions. X-rays (Plate II) showed moderate fibrosis, with diffuse peribronchial thickening and increased density of the hilar and perihilar areas.

REPORT OF STUDY

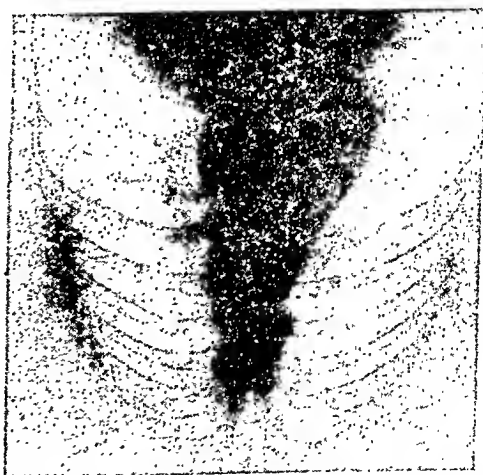
In the plant studied, bathroom ware exclusively is manufactured. The clay mixture contains 20 per cent silica, 26 per cent feldspar, 27 per cent English china clay, 10 per cent domestic china clay, 11 per cent English ball clay, and 6 per cent finely ground pitcher or broken ware. The free silica content approximates 20–25 per cent.

The casting room constitutes the essential dust hazard. Each caster must shake silica dust into, and dry-sand-paper and brush off the dust from his

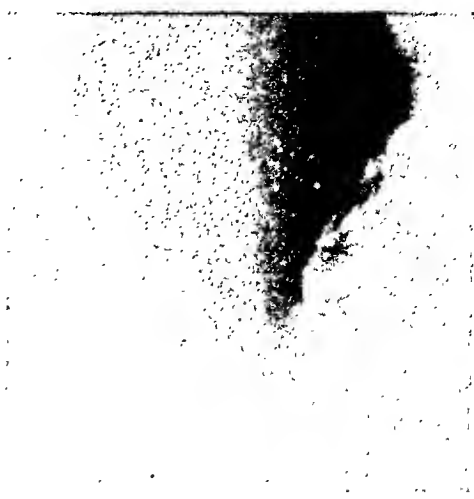
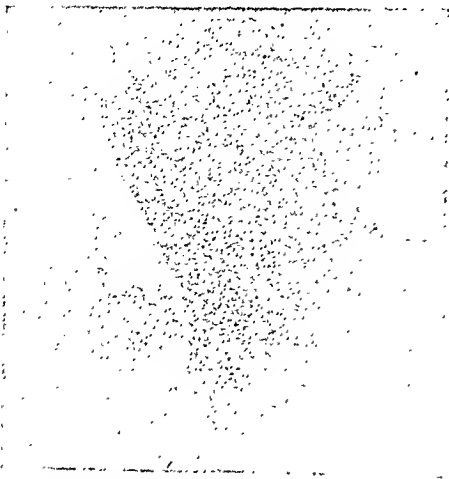
own moulds. He is constantly inhaling silica dust and wears no mask. Occasionally the floor is sprinkled with water. There is no forced ventilation system. The fine dust which settles on the moulds while on the drying rack is blown off with a compressed air hose before the moulds go to the kilns. The dust produced by crushing and regrinding the ware broken during the first



Case 17—J. G., age 42 years, a caster for 19 years, had a negative history, symptoms and physical findings. X-rays (Plate III) revealed moderately advanced nodular fibrosis of the upper two-thirds of the lungs with dense hilar, perihilar and lower peribronchial shadows and diaphragmatic adhesions.



Case 34—J. S., age 48 years, a presser and caster for 27 years, had negative history, no symptoms, and had avoided inhaling dust when possible. Harsh breath sounds posteriorly, and a few coarse basal râles were heard. Fluoroscopy showed diaphragmatic adhesions. X-rays (Plate IV) revealed marked diffuse nodular fibrosis, with early massive confluence of the perihilar nodules.



Case 56—D. P., age 54 years, a potter for 21 years, had influenza 12, and right basal pleuritis 7 years previously. He had complained for 5 years of progressive shortness of breath and weakness, for 1½ years of dry cough, and for 2 weeks of inability to work as a foreman because of "smothering spells" (dyspnea), on the least exertion. He had lost 20 pounds in 2 years. Expansion of the chest was decreased; resonance was impaired in the interscapular and basal regions where dry coarse râles were heard. Breath sounds, harsh throughout, were distant at the bases. Fluoroscopy showed restricted excursion of the diaphragm. X-rays (Plate V) revealed advanced nodular fibrosis with massive confluence in the central and right basal fields.

This patient was awarded total and permanent disability pension by the Industrial Accident Commission of California.

Case 25—H. G., age 43 years, a caster for 12 years, had negative history, no symptoms or abnormal physical findings. X-rays (Plate VI) revealed marked diffuse nodular fibrosis with early massive confluence in the perihilar and inner basal fields. Death occurred 3 months later from respiratory failure 2 days after catching cold at his work. At autopsy were found healed apical (tuberculous) scars, dense, pleural adhesions, streaks of scar tissue scattered throughout both lungs, several small abscesses in the base of the left upper lobe, and scattered small bronchopneumonic consolidations.

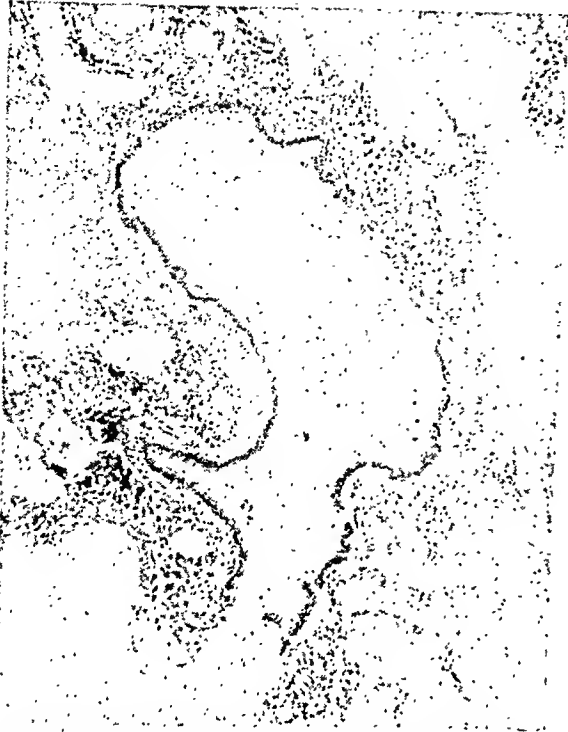
chest were taken. As indicated in Table I, 5, or 8.6 per cent, showed third stage or advanced fibrosis, the average duration of exposure being 16 years. Twenty-two, or 38 per cent, had second stage or moderate fibrosis. The remaining 31, or 53.4 per cent, showed only slight fibrosis. In 5 of these latter the changes were confined principally to the hila.

TABLE I
PNEUMOCONIOSIS (SILICOSIS)

Incidence in 58 of 106 Pottery Workers as Determined by X-rays of the Lungs
(Quaintance-Morris)

Stage of Silicosis			Number	Per cent
Third *	Markedly advanced	3	5	8.6
	Moderately advanced	2		
Second	Moderate	22	22	38.0
First	Slight	26	31	53.4
	Hilus only	5		
Total			58	100.0

* Average duration of exposure was 16 years in advanced group.



Case 25—Early peribronchial fibrosis with siliceous deposits at outer margin. Plate VII.



Case 25—Early nodular fibrosis with many fibroblasts and silica particles at periphery. Plate VIII.



Case 25—Advanced silicotic nodules with beginning massive fibrosis. Note heavy peripheral siliceous deposits. Plate IX.



Case 25—Advanced, nodular silicosis, with marginal emphysema. Note sparsity of silica particles. Plate X.

Pancoast and Pendergrass¹⁶ in a study of 58 potters, reported third stage silicosis in 36 per cent, second stage changes in 48 per cent and first stage

silicosis in only 16 per cent. The average duration of exposure to dust in their series was not given, hence no accurate comparisons can be made.



Case 25—Contiguous, advanced silicotic nodules, with adjacent atelectasis and emphysema. Note absence of siliceous deposits. Plate XI.

TREATMENT

Since the nature of silicosis precludes the possibility of arrest of the progressive fibrosis it is obvious that our efforts must be directed at prevention:

First, reduction of the concentration of silica dust in the inspired air is imperative. Adequate exhaust ventilation equipment will replace dusty with clean air. Wetting will eliminate dust in grinding and mining operations and settle the dust in blasting rooms before workers enter. Chilled iron shot can be substituted for sand in blasting. Enforced wearing of adequate respirators and helmets and proper provision for their supervision and maintenance will protect workmen in occupations where wetting is not feasible.

Second, selective employment will result in the transfer of the unfit to less hazardous occupations. Preemployment examinations, including careful occupational history and record of past diseases, complete physical examination and X-rays of the chest, will make possible exclusion from hazardous occu-

pations of those having had excessive exposure to silica dust (Sappington³¹) and will keep the tuberculous out of dusty trades. Todhunter and Dixon³² suggest acquainting employees with the risks so that they may be educated in self-protection.

Progress is being made. Preemployment and interval examinations by a board of 3 medical examiners are required in Australia, South Africa, Great Britain, and Ontario. Wisconsin, New York, Oklahoma, and Ontario (Sayers³³) have attempted by legislation to limit the concentration of dust particles in the air which workmen must breathe to 10,000,000 per cu. ft.—the silicosis hazard threshold. If silicosis is to be controlled employers must be convinced that these preventive measures not only protect the health of their employees but are economically sound policies from the standpoint of industry.

COMPENSABILITY

Pneumoconiosis is regarded universally as an occupational disease. It is recognized as cause for total and permanent disability pension. In California under recent decisions of the Appellate Court with concurrence of opinion by the Supreme Court, the "date of injury" with respect to operation of the "statute of limitations" is regarded as the time of onset of symptoms or that time when the presence of silicosis could reasonably have been determined by medical examination of the applicant. Where more than one compensation insurance carrier is concerned, the Industrial Accident Commission has been ordered to apportion the liability for compensation as the duration of employment or the periods of insurance coverage would indicate as being equitable.

SUMMARY AND CONCLUSIONS

1. Inhalation of silica laden air results in pneumoconiosis, a progressive, incurable occupational disease of the lungs.

2. Fifty-eight cases are reported from the pottery industry in which the concentration of dust is low, silicosis develops slowly, symptoms are latent and appear many years after physical and X-ray signs of silicosis are demonstrable.

3. In advanced silicosis total and permanent disability for work, and a high susceptibility to pneumonia and tuberculosis are being recognized by the Industrial Accident Boards. Tuberculosis was not observed clinically in the group studied; pneumonia terminated 1 case.

4. Prevention of inhalation and reduction in concentration of silica laden air must receive more attention from the industries concerned, state legislatures and the medical profession if silicosis is to be controlled.

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League of Mental Hygiene in Brazil

THE National League of Mental Hygiene of Brazil, according to its recent report, has been giving most of its attention in the 10 years of its existence to a campaign against alcoholism, to physical examination of persons intending to marry, particularly men, and to child guidance work. The child guidance clinic established by the league is working with mentally retarded or

otherwise mentally abnormal children in some of the public schools of Rio de Janeiro. Each child is given a thorough physical and psychological examination, and a written report of his condition with the necessary advice is presented to the parents. The results of this work are highly praised in Brazil.—*Archivos Brasileiros de Hygiene Mental*, Rio de Janeiro, 6, 4, 1933.

Salmon Inspection^{*}

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THE salmon has been a much appreciated article of food for untold centuries. Its bones have been found in the kitchen middens, or waste piles, of many forgotten peoples and some 10,000 years ago an unknown artist left us a record of this fish rather skillfully engraved on a piece of reindeer bone. This pictured fragment of bone, dug from the ashes in the floor of a cave in central France, shows that the salmon was valued by prehistoric men when the reindeer, following the retreat of the great glacial ice sheet, roamed throughout that section. Some of the earliest written records of the British Isles and Northern Europe have to do with fishing rights and "laws anent the saumon"; while early explorers along the shores of both the Atlantic and Pacific Oceans, north of the 40th parallel, found the natives depending largely upon this nutritious fish.

The salmon is an anadromous fish, that is, it requires both fresh and salt water for its complete life cycle. First seeing the light of day in some clear cool mountain streamlet or lake it spends a varying period of time in fresh water and then slips out into the sea, where food is more abundant, and growth is rapid. Arriving at maturity the salmon returns to fresh water to lay and fertilize its eggs, providing for the next generation. This spawning migra-

tion brings the fish together in great schools and makes their capture easier. In earlier times, this migration of mature salmon produced alternate periods of feast and famine, and various methods of preservation were developed to take advantage of nature's bounty and to ward off want as long as possible. Drying and smoking were probably the first preservative methods practised, and early records tell of extensive trafficking in salt salmon, while ice for the wider distribution of fresh salmon came into use about 1780. However, salmon did not become a world food, available in every important market, until after 1864 when the comparatively new method of food preservation known as canning was first employed.

From the Sacramento River in California, and a pack of a few hundred cases, the new industry spread to the Columbia River, Puget Sound, British Columbia, Alaska, Siberia, and Japan, and a yearly pack of some 9 million cases. A standard case for statistical purposes consists of 48 1-lb. cans or the equivalent, 96 ½-lb. cans or 192 ¼-lb. cans. The first small crudely built cannery on a scow has been replaced by hundreds, ranging in size from plants capable of canning a few hundred cases a day up to those that can pack 8,000 or 9,000. Some of these are poorly built and equipped, others are models of efficiency and design, splendidly equipped and scrupulously clean.

The salmon known to the artist cave-man, to Izaak Walton, the enthusiastic angler, to Spenser, Dryden, Shakespeare,

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and other early British writers, was the Atlantic salmon, *Salmo salar*. This fish is still found in many of the rivers emptying into the Atlantic Ocean north of the 40th parallel and furnishes considerable sport for fishermen and a small amount of fresh and frozen salmon for an appreciative market. Practically none is canned. All of the canned salmon of commerce is supplied by the closely related Pacific salmons of which there are 5 species, all belonging to the genus *Oncorhynchus*. These are: *O. tshawytscha*, chinook, spring or king salmon; *O. nerka*, sockeye, red, or blue-back salmon; *O. kisutch*, silver, coho or medium red salmon; *O. gorbuscha*, pink salmon; *O. keta*, chum or keta salmon. The steelhead, *Salmo gairdneri*, although a trout, is occasionally packed as a salmon but forms only 0.3 per cent of the world's pack.

The most striking biological difference between the Atlantic salmon and the Pacific salmons is that all of the latter die soon after spawning, while, with good fortune, the former return to salt water to recuperate and may live to spawn several times. In this respect the steelhead resembles the Atlantic salmon.

DECOMPOSITION

The salmon, like other fish, being buoyed up by the water in which it swims, does not need as firm a structure as that required by land animals. Consequently it is more loosely put together with less connective tissue and while this contributes to a greater degree of digestibility of the flesh than is the case with meat, it also renders the fish more susceptible to damage by roughness in handling and to those decomposition changes leading to spoilage. It is imperative, therefore, that salmon should be handled with great care and canned, or otherwise preserved, as quickly as possible in order that deterioration may be kept at a minimum.

The term decomposition includes all of the changes that take place in the fish whereby it is broken down into its simpler substances. These may be due to enzymes secreted by the salmon itself, under control during the life of the fish but capable of digesting its tissues after death, or the changes may be due to the activities of bacteria. The muscle of the living salmon is practically always free from bacteria^{1, 2} but on the outside and in the gills, mouth, and digestive tract of the feeding fish there are large numbers of them. When the salmon is well started on the spawning migration it ceases to feed, the digestive tract shrinks and in most cases becomes sterile.² Feeding salmon should be cleaned immediately after catching while those that have ceased feeding may be safely left in the round for a few hours.

Any conditions of handling or storing which tend to increase the activity of the enzymes or to introduce bacteria into the flesh should be eliminated or prevented to as great an extent as possible. Rough handling, bruising the flesh, even though it may not break the skin, will increase the activity of the enzymes, further loosening the tissues and preparing the way for a more rapid invasion of the bacteria. Any breaks in the protective skin naturally permit the entrance of bacteria into the flesh. Temperature has much to do with the rate of activity of both enzymes and bacteria, so that during warm weather fish must be handled more carefully and rapidly than during cool weather.

DETERIORATION DURING SPAWNING MIGRATION

After the migrating adult salmon ceases to feed, it necessarily lives upon its stored up fat and protein. Work done by Green³ showed the effect of this spawning migration fast very strikingly in the disappearance of fat globules from within the muscle fibers

and changes in the fibers themselves. Certain Russian scientists⁴ made a very thorough study of the changes that took place in the Amur River chum salmon between the time some of them were caught in the open sea just as the migration started and those taken on the spawning beds as they were perishing. Some 97 to 98 per cent of the fat and 57 per cent of the protein was expended. Unpublished work by Shostrom (of this laboratory) shows a change in the average fat content of the pink salmon caught in one trap in Southeastern Alaska during the fishing season of 1930 from a maximum of 9.88 per cent to a minimum of 4.30 per cent. These fish were still in salt water with a long journey to the spawning beds ahead of them. There are other changes such as a softening of the texture, a bleaching out of the color of the flesh, and an abnormal coloring of the skin that take place during the migration. Naturally those fish taken early in the migration are superior in quality to those taken later.

Changes that have taken place in the fish due to deterioration during the spawning migration, to rough handling or to decomposition, all leave their marks on the canned product which can be detected and interpreted by the trained examiner.

INSPECTION OF CANNED SALMON

The more progressive canneries make a practice of examining some of the cans from each day's pack in order to correct any faults that may have crept into their methods, and those following this practice conscientiously seldom have trouble with their pack later on.

After the salmon pack is put up, it may be examined by one or more of several different agencies or organizations; governmental, trade associations, buyer or buyer's representatives. Of these groups the first is usually interested only in the condition of the

fish from the standpoint of freshness or in misbranding; the other groups are also interested in quality and in workmanship.

GOVERNMENTAL INSPECTION

United States—The federal government has, for many years, taken a very active interest in canned salmon. The Food and Drugs Act of 1906, as amended, established very definite and rather sweeping principles for the regulation of interstate traffic in foods and drugs. Some 80 per cent of the total American pack of canned salmon is produced in Alaska, a territory. Most of that produced in the coast states of Washington, Oregon, and California is shipped elsewhere for consumption and so becomes subject to federal regulation.

Government inspectors visit as many of the salmon canneries in Alaska and in the states during the packing season as their limited personnel and the great distances to be covered permit. They also draw samples from some of the parcels in interstate shipment for examination, which is confined for the most part to a determination as to whether any of the provisions of the Act have been violated.

Section 7 of the Act states that a food shall be considered adulterated "if it consists in whole or in part, of a filthy, decomposed, or putrid animal or vegetable substance." Literally construed this provision is very sweeping. The misbranding provisions of the Act require that none of the statements made on the label shall be "false or misleading." The Act does not require that the species of salmon be named on the label but the Code for the Canned Salmon Industry makes this mandatory. The net weight amendment of 1913 provides that all foods in package form shall bear a clear statement of the net contents and a regulation issued under the McNary-Mapes amendment of 1930

requires that the can be reasonably well filled.

The states and many municipalities have food laws and regulations, largely modeled upon those of the federal government.

Canada—The Dominion Government passed an Act in 1907 known briefly as the "Meat and Canned Foods Act." An Order in Council of April 4, 1932, created a Board of Inspection whose duty it is to examine all canned salmon packed within the Dominion. This board is composed of 3 men, trained in the examination of canned salmon, who inspect and report upon the quality and condition of the various parcels. If found "to be fresh, firm, well packed, and in good merchantable condition," it is approved and a certificate to that effect issued to the canner. Canned salmon found "to be sound, wholesome, and fit for human food," but failing in some respect to quality for a certificate is marked "Second Quality." This legend is embossed on can ends which are clinched on over the original end or ends, so as to conceal the word "Canada" usually embossed thereon. Canned salmon found "not to be sound, wholesome, and fit for human food," is confiscated and either destroyed or used by the Department of Fisheries in the feeding of small fish at the hatcheries and rearing ponds.

The law also requires the code marking of all cans in such a way as to show the species of salmon, the date of canning, and the name of the packer. The "first letter of the code marking shall represent the species as follows: Sockeye S, Pinks P, Cohoes C, Chums K, Springs T, Bluebacks B, Steelhead trout H." (The blueback in Canada is an early run of coho instead of a red salmon as it is on the Columbia River.)

Japan.—The Japanese Government maintains a supervision over the quality of canned salmon intended for export, and under its auspices the Japanese

Salmon Cannery Association, to which all salmon canners must belong, was organized in 1931. The association at its 8 inspection stations conducts a strict inspection in accordance with regulations issued by the Ministry of Agriculture and Forestry. Inspection is made of the outward appearance of cans and cases and of the contents.

The regulation further stipulates that after the examination, canned salmon is to be classified into 3 classes, namely, Passed, Non-exportable, and Rejected. The passed goods are further classified into 3 grades: First Class, or Choice; Second Class, or Standard; and Third Class. The first 2 classes may be exported to any part of the world, the third used only in Japan and a few specified countries. Rejected goods may not be sold anywhere.

EXAMINATION BY BUYERS OR BUYERS' REPRESENTATIVES

From the beginning of the industry it has been customary for the prospective buyer to demand samples for his own examination. While this is still done in some instances, it has become general practice for the buyer to rely upon the examination of some third party. Large buyers frequently have their representatives, living in the principal centers of production, who know what the buyer desires and make the examinations for him, selecting for shipment such parcels as meet his requirements. Smaller buyers, whose volume of business does not warrant a special representative, frequently rely upon the experience and judgment of public examiners for an impartial inspection of parcels in which they may be interested.

EXAMINATION BY TRADE ASSOCIATION

While the actual examination of canned salmon in Japan is performed by representatives of their trade associa-

tion; it is made under government supervision and is, therefore, virtually a government examination. The Canned Salmon Section of the Canadian Manufacturers Association is a voluntary organization and does not include the examination of canned salmon among its regular activities. The Association of Pacific Fisheries and the Northwest Salmon Cannery Association are voluntary American trade associations having offices in Seattle and comprise within their membership practically all the salmon cannerys operating in the United States and Alaska. They do not, however, include the inspection of canned salmon among their regular activities.

The National Cannery Association was incorporated in 1907, and in 1919 established an office and laboratory in Seattle, later known as the Northwest Branch. An office and general laboratory are maintained at 826 Skinner Building, and a canned salmon laboratory at Pier 40. The laboratory has spent much of its time in the examination of canned salmon. One of its first activities was a comprehensive study⁵ of the changes that take place in salmon during the early stages of decomposition. Salmon of each of the 5 species were taken alive from traps and held under cannery conditions, as far as possible, for several days. Each day some of the fish were subjected to detailed physical, chemical, and bacteriological tests, and then canned. Afterward the canned product was carefully examined physically, chemically, and bacteriologically, and the results were correlated, so far as possible, with the condition of the fish before canning. It was found that the quality of the fish as caught and the conditions and methods of handling were reflected very closely in the quality and condition of the canned product. Various other experimental packs have been made since to clear up certain points in the correla-

tion between the raw fish and the canned product.

Partly as the result of these studies, partly from the rather complete records of the examination of several thousand cans of salmon, and partly from the experience of several commercial examiners, a systematic method for examination was evolved.⁶ This has been modified slightly from time to time, but in principle has not been greatly changed. While the commercial examiners and buyers' representatives do not follow this method in detail, they do look for many of the same significant factors of quality and condition, and it is apparent that a considerable degree of uniformity in the method of examining has been attained. This uniformity is being promoted most actively, perhaps, through the Annual Canned Salmon Cutting Demonstrations where samples of all species, and from all American packing districts, are opened and judged by committees made up of men actively engaged in the production and merchandizing of canned salmon. It is, of course, highly desirable that all persons employed in this inspection should use the same general terms in speaking of the significant factors and should evaluate these factors on a fairly uniform basis.

EXAMINATION OF CANNED SALMON

The method in use by this laboratory will be outlined in order to bring out the significant points to be considered. Canned salmon is shipped, warehoused, bought and sold in blocks or parcels, varying in size from a few cases up to 50,000 or even more. The first step in the examination of a parcel is to obtain a very complete description of it, including the packer, cannery, species, brand, size and kind of can, can or code marks, number of cases, location in warehouse, etc. Careful attention to detail is frequently of great importance.

SAMPLING

An attempt is made to draw as representative a sample as possible, including all the different code marks to be found in the parcel. The sampling schedule calls for 12 cans (1 from each of 12 cases) in a parcel of 100 cases, 36 cans from 1,000 cases, 144 cans from 10,000 cases, etc. While the sample cans are being drawn the general condition of the parcel is also noted.

EXAMINATION

The examination of the sample cans covers:

1. Bacteriological and microscopical examination
2. Workmanship in packing
3. Quality of the fish when caught
4. Condition of the fish when packed
5. Chemical examination

Routine examination does not include the first and fifth of these divisions. Under special conditions these are sometimes employed however.

BACTERIOLOGICAL AND MICROSCOPICAL EXAMINATION

By the use of appropriate culture media, tests are made to ascertain if the cook used was sufficient. If spoilage has occurred in the parcel a bacteriological examination is desirable. By a direct microscopic examination and bacteria count, considerable information can be gained as to the condition of the fish when canned. The microscope has been used also to aid in the identification of the species of salmon through a study of the scales, which carry a record of the age of the fish when caught.

WORKMANSHIP IN PACKING

Under this head are included the evidences of all those fishing and cannery operations the effect of which may be observed in the canned product. Bruises and pugh [one-tined fork] marks, evidences of rough handling, are shown by blood clots and discolored

areas. The fish should be clean and free from all waste parts. It should be well placed in the can and consist of only 2 or 3 pieces. A proper cook is indicated by a rather soft and friable bone. A definite slightly salty taste is required to bring out the full flavor of the fish. Cans must be reasonably well filled, and the net weight equal to the amount stated on the label. They should possess a vacuum at sea level of 6 or 8 inches of mercury, as shown by a suitable gauge, in order to maintain a normal appearance if shipped to a warm climate or a high altitude. Cans having little or no vacuum may become "springers or swells," and thus unmerchantable, under these conditions.

QUALITY OF FISH WHEN CAUGHT

Each of the 5 species may range from very good to very poor when caught. This difference is due at times to a variation in the available food supply in the different sections, but usually, however, to the stage of the spawning migration. The examiner must take into account the characteristics of the different species in judging the color and texture of the flesh and the amount of free oil in the can. The oil is measured in cubic centimeters and compared with a standard chart based on the examination of some 79,000 separate cans in 1933. During the spawning migration the normal color gradually fades out, the texture softens, and the fat, from which the free oil comes, grows less.

CONDITION OF THE FISH WHEN CANNED

Under this head are included all the factors to be observed in a can which are noticeably influenced by the condition of the fish as concerns freshness, or lack of it, when canned. Fish are very delicate, easy to injure, and decompose very easily. Many opportunities for spoilage between the catching and the canning exist, and the excellent

condition in which the bulk of canned salmon reaches the market speaks well for the care and resourcefulness of the average packer. Much can be learned of the condition of the fish when canned from the odor, texture, "reddening" of the flesh, "honeycombing," and turbidity of the liquid.

The odor is the most generally applied and, perhaps, the most reliable test for decomposition or lack of freshness. The sense of smell is not equally developed in all people, and considerable experience is required before one is qualified to pass upon the odor of canned salmon. An abnormal "feverish" or reddened, appearance of the flesh is sometimes found, and occasionally little pits in the flakes which may extend entirely through them ("honeycombing"). These conditions are both due to the activity of bacteria and are not common. The liquid is always somewhat turbid but decomposition increases the turbidity, and when advanced may cause a milky appearance.

CHEMICAL EXAMINATION

In certain instances a chemical examination may be made of the contents of the can to detect the presence of certain products of decomposition, but such tests are slow and not adapted to routine analysis.

APPLICATION OF THE ABOVE SYSTEMATIC METHOD OF INSPECTION

While this method in substantially its present form has been used by this laboratory for some 12 years it was not until the 1933 packing season that it was tried out on a large scale. During that season the entire pack of some 46 different canning companies, totaling over 4,000,000 standard cases, was given a very thorough examination. There

were about 2,300 separate parcels upon which separate written reports were made covering workmanship, quality, and condition. Over 93,000 individual cans were opened and the can and contents examined. Whenever a single tainted can was found additional samples were taken from the parcel, and if further bad cans were found amounting to as little as 2 per cent of those in the parcel or code mark affected, the parcel or code was "reconditioned" by removing all of the stale or tainted cans. To do this each can in the parcel or code was opened and the bad ones destroyed. The good cans were closed and re-cooked. Only a few lots were found to contain bad salmon. Two small lots were destroyed due to poor seams on the end of the cans.

On the whole, the salmon pack for 1933 was found to be very satisfactory. This inspection was, perhaps, the most extensive ever carried out on any single food commodity. The packers co-operated whole heartedly and an even larger number have requested an examination of their entire 1934 pack, so that it is estimated that some 6,000,000 cases will be inspected by the laboratory this year.

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EDITORIAL SECTION

Expressions of opinion and statements of supposed facts are published on authority of the writer under whose name they appear, and are not to be regarded as expressing the views of the American Public Health Association, unless such statements or opinions have been adopted by vote of the Association.

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CULTURES IN THE DIAGNOSIS OF TUBERCULOSIS

FROM England comes a report,¹ giving methods which if proved to be practical in general use, as they seem to be, should revolutionize the diagnosis of various forms of tuberculosis as far as the finding of the specific organism goes. The method originated in the Tuberculosis Department of the State Serum Institute, Copenhagen, at the hands of K. A. Jensen, who devised the culture medium which has been so successful. It is apparently a modification of that used by Lowenstein in his remarkable work.

The English report is the result of about a year of work. The writer, as Assistant Medical Superintendent of the Wooley Sanatorium, has had abundant opportunities to obtain material. She attributes her success not only to the culture medium but to the use of the screw-topped bottle in place of the customary test tube.

From the middle of September, 1933, to the middle of February, 1934, she has obtained positive cultures from some 250 specimens which were microscopically "T. B. Negative." The majority of these were sputum, but pus, urine, cerebrospinal fluid, and pleural fluid also gave positive cultures, often luxuriant. Apparently there is no more difficulty in cultivating tubercle bacilli of bovine type than those of human, though the characteristics are entirely different. It is said, however, that the human bacillus passes through a stage in which it is not distinguishable from the bovine. In profuse growths and prolonged incubation, the bovine colonies acquire color and lose their original smooth, shiny character.

In Denmark, Jensen at first confirmed his cultural findings as to type by the inoculation of rabbits, but later discontinued this when the growth was typically human, but continued it with bovine organisms. Holmes feels that with the growth obtained on her medium—a slight modification of Jensen's due to drugs furnished in England—and the screw-topped bottle, the differences are so clearly brought out that bovine cultures may be typed by this method alone, as in only 2 or 3 per cent is any difficulty found.

The author gives directions for making the culture medium, but believes that

there should be a central supply in each district for the use of general hospitals, sanatoria, tuberculosis clinics, etc. In addition to positive findings in doubtful cases, she believes that there is great value from the administrative standpoint, especially in regard to the infectivity or otherwise of tuberculous patients. Since positive cultures have been obtained in over 50 per cent of so-called "negative" sputa, she holds that such persons are at least as often as not infective to others.

Another point of importance concerns the transference of types of infection from one patient to another. The case is cited of a woman who was placed in a three-bed cubicle with two pulmonary tuberculosis patients. The physician in charge finally classed her as non-tuberculous and moved her to a "clean" ward, where she developed pulmonary disease. Examinations of sputum obtained by stomach washing gave positive cultures of bovine tubercle bacilli. It was then found that one of the two other patients in the cubicle had bovine phthisis. This is apparently the first case of infection from man to man with the bovine tubercle bacillus.

If sanatoria and laboratories generally are able to duplicate these results, the origin of the infection in many obscure cases will be cleared up. We will have at hand a method which should aid greatly in the fight against the spread of tuberculosis.

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BAILEY K. ASHFORD

IN 1898 when the American Army invaded the then Spanish Island of Puerto Rico there was in the Medical Corps of the Expeditionary Forces a lieutenant named Bailey K. Ashford. Ashford went through the campaign and after peace was concluded, remained in Puerto Rico off and on until his death on November 1, 1934.

His biography, *A Soldier in Science*,* gives a very interesting and readable account of his early years in Puerto Rico, and is one of the best descriptions of medical service in the World War which have yet been published. When he first went to Puerto Rico in 1898 the United States had very little conception of what we understand today as tropical medicine and it is largely due to the investigations of Ashford that the American medical profession and public became interested in diseases of the tropics. In his studies of hookworm anemia in Puerto Rico, Ashford threw light on a disease which previously had been shrouded in darkness. The disease had been studied in Egypt, in mines in Germany, and at the St. Gothard tunnel in Switzerland, but to the American public the subject was almost a closed book. Ashford's clear-cut demonstration of the hookworm as the cause of the anemia of Puerto Rico was so convincing that his leadership in tropical medicine in the Americas was established for all time. His investigations were followed by a program of control and, so far as possible, of eradication of the disease from the island to which he devoted his life. In traveling through Puerto Rico with Ashford it was amazing and gratifying to see how the people, not merely of the cities, but of the country districts, knew him personally, respected his unselfish interest in their welfare, regarding him in the light of a father and protector. Few medical men have ever exerted such a broad influence in improving health and social welfare in their communities as Ashford in Puerto Rico.

* For review see *A.J.P.H.*, Oct., 1934, p. 1085.

When the knowledge of his hookworm studies became available in the United States it acted as a stimulus to physicians on the mainland to review their own experiences with reference to this hitherto unknown disease with the astonishing result that studies patterned after Ashford's carried out in the southeastern states showed that we too had an unsuspected problem in tropical medicine within our own borders. The health departments and physicians in general in these regions took up the work throughout the South and it continues to this day, fortunately with the same success in its treatment and prevention that Ashford himself had experienced in the island.

During the many years of his life in Puerto Rico he acted as adviser to the Government in health matters. He was the main factor concerned in building up the School of Tropical Medicine in San Juan under the auspices of Columbia University and the Government of the island, and here he continued his work in the study of the anemias and of another troublesome disease of the tropics called sprue, to which he contributed many stimulating hypotheses regarding its etiology. The disease, as every one knows, is still more or less mysterious, but our interest in it and the progress which has been made toward its understanding is due in no small measure to the initiative of Ashford.

During his busy life in Puerto Rico he developed a considerable practice in general medicine, but more especially in surgery, and was highly esteemed by the Insular medical profession as a leader in medicine, as well as in public health.

In the death of Colonel Ashford the medical profession has lost a distinguished member and our fellow citizens of Puerto Rico have lost a lovable friend whose daily work was guided by a rare idealism. Dr. Ashford was a member of the A.P.H.A. from 1912 to 1924.

SEWALL AND ANTITOXIN

THE Michigan Chapter of the Delta Omega public health society was concerned last year in reviving interest in a pioneer research of Dr. Henry Sewall. It had photostatic reproductions made of a paper published in the *Journal of Physiology*, of the year 1887, Vol. VIII, p. 203, which reports experiments on the preventive inoculation of rattle snake venom. A bronze plaque was presented to the University of Michigan commemorating the work.

The importance of this early work has been suggested in part by requests of European visitors to see the rooms and equipment used by Dr. Sewall in his experiments. Unfortunately nothing of the sort remains except in the memory of Dr. Sewall and one or two other men now living.

It has been suggested that these experiments and the following sentence from Dr. Sewall's paper may be viewed as the foundation upon which the great development of antitoxin has been erected.

If immunity from the fatal effects of snake-bite can be secured in an animal by means of repeated inoculation with doses of the poison too small to produce ill effects, we may suspect that the same sort of resistance against germ-disease might follow the inoculation of the appropriate ptomaine, provided that it is through the products of their metabolism that bacteria produce their fatal effects.

Recent correspondence with Dr. Sewall resulted in several reactions of modesty and unconcern as to personal recognition, and this gives further evidence of his greatness as a scientist and as a man. "I had long ago made myself content with the thought that self-aggrandizement is the least worthy of all rewards of scientific research."

PUBLIC HEALTH EDUCATION*

"Darwin was not above writing in a popular vein; neither was Tyndall or Huxley. Sir Humphrey Davy delivered numerous popular lectures on physics. Michael Faraday gave demonstrations of his researches in electricity to lay audiences."

IAGO GALDSTON, in *Better Times*

What We Noticed at Pasadena—
Further observations at the 1934 annual meeting will be welcome. A Section officer sends these informal notes:

The luncheon on health education materials showed us one thing at least—that we are all children who like toys. The profound moral is: simple things amuse and entertain and attract attention—don't be too high-brow if you want to get over health education.

It was nice to meet our co-laborers of the West Coast. Health education problems and effective programs are the same regardless of climate. Query: Wouldn't one of Dr. Peter's Chinese parades do more good in an American city than tons of pamphlets?

In Pasadena we at last had a chance to see what Routzahn's show looked like when it was all spread out where we could get at it. Did you notice there was someone studying his material all the time?

Dr. Tonney did a fine job on the radio program. Perhaps he should be made an honorary member of the Health Education Section.

Some of the radio speeches, by the way, could have benefitted with a little health education technic: splendid material, packed full of facts, excellent for a professional audience. Did they register with the populace?

Did you see the 17th Century English proclamation in the exhibit at the Huntington Library? There was one on the use of clean materials for filling pillows and mattresses. Baltimore passed a similar law a few weeks ago. Maybe this is why Huntington Williams felt that progress in health education was about as rapid as the erosion of the Grand Canyon.

When are we going to codify our knowledge of health education technic? Do we need a "Standard Methods of Health Education"?

Institute Enrollment at Pasadena—
The Institute attendance originated geographically as follows:

States and provinces: Arizona, British Columbia, California, Colorado, Hawaii, Oregon, Utah, Washington . . . Alabama, Tennessee . . . Illinois, Michigan, Minnesota, Missouri, Wisconsin.

California cities: 34 cities from which came 1 registrant; 9 cities with 2 registrants, 4 cities with 3; 5 cities with 4; 2 cities with 5; 1 city with 8; 1 city with 9; San Diego, 12; Los Angeles, 30; with 21 unidentified.

Prevent Cancer Among Mothers—
That "mothers' best protection against cancer of the cervix of the womb" is "the repair of all injuries and irritations following the birth of a child, and semi-annual pelvic examinations," was urged at Pasadena by Mrs. George F. Becker.*

Mrs. Becker, who presented her paper before the Public Health Education Section, is connected with Dr. Joseph Colt Bloodgood's Clinic and Diagnostic Center, Baltimore.

Mrs. Becker said that

. . . if mortality from cancer of the cervix is to be decreased, the medical profession, the public health workers, the nursing

* Please address questions, samples of printed matter, criticism of anything which appears herein, etc., to Ewart G. Routzahn, 130 East 22d St., New York, N. Y.

* Delivered before the Public Health Education Section, Sept. 4, 1934.

profession, the social worker, federations of women, state and local governments must all unite in a standard and continuous educational campaign.

Representatives of the local departments of health, with the aid of the social workers, and the Red Cross representatives, and with the governing authority, could provide clinics and literature for those mothers who cannot afford to have their own family physicians. Each community, no matter how small, has its clubs and societies, its Red Cross Chapters, its nursing organizations, and its county board of health. Through these units there should be no difficulty in conquering cancer of the cervix of the womb. The medical profession admits that the majority of people today do not reap the benefit of modern medicine because of fear, ignorance, and finances. Therefore, to meet the situation in each locality, city and state (and in some instances interstate), the endeavor to prevent cancer of the cervix should be carried on by the local organizations. These should include not only the medical group, but all women's organizations, men's organizations, schools and nurses' training schools.

Selling the Health Department—

At Pasadena a paper was read by Kenneth W. Grimley,* director of the effective Bureau of Health Education and Publicity of the Jefferson County Board of Health, Birmingham, Ala.

Mr. Grimley's title was "The Technique of Selling the Health Department to the public." By omitting "Technique" the title would have been more accurate for Mr. Grimley concerned himself with the attitudes of those who do health department publicity and their professional preparation.

Mr. Grimley emphasized that

... salesmanship demands that one believe. It requires that you who sell health really, honestly, believe in the possibility of preventive medicine; that public health is purchasable in truth. Superficially it may seem that further discussion of this point would be a waste of time. But actually many of those engaged in public health, including

some disciples of public health education, have but a faint faith in its achievements and possibilities. We have all encountered health officials to whom the words *public health* convey nothing beyond the routine exercise of a petty police power in return for daily bread. Obviously such persons will not be adequate salesmen of the cause they represent. But of such we can expect but little, and thus need not fear disappointment.

A much more serious tendency is that exhibited in recent years in higher and more exalted circles. There is present in the world leadership of thought today, a widespread attitude of more or less sterile, critical intellectualism. I would not deny that science itself is founded upon the attitude of challenge. But ships and shoes and wax for seals are not sold by intellectualism—by people anxious to appear commanding leaders of pure thought. When we have reached the point where whole sessions of this section are keyed to an attitude of questioning, critical limitations, doubt—we are trying to become just too scientific; too brilliantly intellectual. Things are sold, even public health, by an attitude of enthusiasm, of belief in their usefulness, their possibilities, their service to mankind. Regard with an air of superiority if you will, the verve of salesmanship. But if your mind is too splendid an instrument to dig ditches through the mud of ignorance, by all means withdraw from a defiling task. To sell public health, you must believe. You must believe in public health. You must believe in its high promise that some day infectious disease shall be banished from the earth. You must believe that some day, through its wise administration, the crushing load of diseases, ill health, physical handicap, premature death, shall be removed and all mankind shall enter into that heritage of life abundant which is the promise of civilization.

Then of course the publicity worker must know public health.

Public health publicity is rather obviously a union of two distinct skills, or techniques, or sciences; that of public health on the one hand, and of publicity on the other. Both of these fields are the domain of experts, of professionally skilled craftsmen. The selection of personnel to perform the joint task of public health publicity is thus not easy. It is a task so difficult, in fact, that it is usually but half done; that is, a person is selected who is entirely competent in one branch, and rather sketchily equipped in the other.

Some public health officials in establishing

* Presented at a Joint Session of the Health Officers and Public Health Education Section, Sept. 5, 1934.

bureaus of divisions of public health publicity seem to have a feeling that of the two, a skill in publicity is more essential. Thus we find publicity services manned by individuals more or less well grounded in the field of publicity, but whose knowledge of public health is largely hearsay. . . .

. . . To sell a department of health is a much more involved procedure than the sale of a car or a washing machine.

Public health requires of its salesmen a knowledge of preventive medicine in the abstract; a knowledge of its traditions—of its glorious history of achievement—of the lives of that company of immortals in whose debt humanity will ever be. The glamour of the great victory against disease and death can never be told by one unfamiliar with its recorded pages, however well he may speak the common tongue.

To sell public health one must know it in the concrete example one is selling. A department of health—even a small one—is a complex, dynamic thing, with a history, with policies, achievements, defeats and victories, tasks done and undone, opportunities, unsolved problems, ideals to which men have patiently devoted lives.

"Free" but Not Free—Most references to "Free" in this department of the *Journal* mean that *single copies* are supplied to health workers *free*, or for return postage. A few readers are inclined to ask for copies for distribution to the public or to all teachers in a school. Insurance companies and commercial advertisers are about the only sources for securing free material in quantity. It seems hardly fair to expect local or state departments to supply material for distribution in other states or cities.

Do We Need a Dictionary?—Do we need a professional dictionary covering such terms as "principles," "technics," "philosophy," "fundamentals," and other rather common word symbols? Although they are accepted as having fairly precise meanings we had a feeling at Pasadena that the preciseness was in the mind of the speaker. Frequently it was doubtful that all the hearers read the same mean-

ing into what they heard. May this lack of a common meaning be a cause of confusion and what seemed to be muddy thinking in discussions?

Broadcasting in Manitoba—The Manitoba Department of Health, at Winnipeg, is broadcasting three times a week via station CKY:

Tuesdays at 4:30 P.M. alternating with

Wednesdays at 12:30 P.M.

Fridays at 4:30 P.M.

In October and November, 1934, were presented on Tuesdays and Wednesdays two series on "Present Health Problems" and "Changing Health Needs," and "Child Health Problems" on Fridays.

"Mr. Average Citizen," a dramatic series in which Mr. Average Citizen "visits health agencies in Manitoba to find out their purpose and work" will come on Tuesdays and Wednesdays through January, February, and March. On Fridays in January a "woman's club representative" will report a series of visits to women's organizations, telling what they are doing to promote health.

Fridays in the following three months will be devoted to "My Body and How It Works," a series of stories for older children to supplement school lessons in physiology and hygiene. The stories have been adapted with permission of the authors, Dr. W. W. Peter, Dr. O. Reisse and Mrs. D. W. Baruch, and Harper and Brothers.

What Have You?—From time to time we mention individual requests for specific types of material. Your responses to such requests usually aid intensive efforts which seem worth while to help along. The editor of this department would value carbon copies of replies sent. We would like to learn what is available on special subjects and for special uses. Please answer, and please send us carbon copies.

The chairman of the Public Health Committee of the Central Branch of the Chicago Y.W.C.A. writes:

In a recent study of the health of Y.W.C.A. members and students, it was found that the eight most prominent physical disabilities and conditions existing among these women were: thyroid, tonsils, dysmenorrhea, constipation, malnutrition, heart, foot trouble, and overweight.

We are doing a good deal of study on these subjects and are making plans to put over a program of detection, prevention and care of these conditions to the hundreds of women reached by the Y.W.C.A. I am interested in getting hold of promotional material on these subjects, particularly posters, and I am appealing to you for information as to where to go.

Please address Marcella River, 4901 Ellis Ave., Chicago, Ill.

Please send copies of health education material to Dr. H. V. Tilak, Bombay Presidency Baby and Health Week Assn., DeLisle Road, Bombay (11), India.

Journals of health agencies are invited by Jewish National and University Library, Jerusalem, Palestine.

Use Your Own Special Audience—Dr. William P. Brown has been writing on public health for a Catholic magazine or two. There he has a ready-made audience, more or less willing to read about public health when presented in the special setting to which this audience is familiar.

Thus Dr. Brown points the way to a simple extra bit of service open to practically all health workers and teachers. Connection with a lodge or club, church or educational group, or any one of our countless centers or—those having like interests, offers a medium for the health worker. The organs of these groups may have local or state, or even national circulation.

Health councils as well as individuals might well try to interest health workers in this idea.

For samples of what Dr. Brown has

written address him in care of State Education Dept., Albany, N. Y.

The Study of Public Opinion—Princeton University Press, Princeton, N. J., has issued "A Reference Guide to the Study of Public Opinion," by Professor Harwood L. Childs, with a preface by Edward L. Bernays. 105 pages. \$2.00.

There are several hundred reading references classified under main headings and numerous sub-headings. Each section opens with an introductory statement, and closes with "topics for further investigation."

Some of the chapter topics: "Leaders and managers of opinion" (biographical); "The development of organized opinion management"; "The technique of organizing pressure groups"; "Instruments of opinion dissemination"; "What is public opinion?" It is in no sense a manual on methods.

For most topics there is much more material than any one is likely to use, but it should be understood, as is pointed out by the author, that the references are uneven in value.

Under "The Press" there is no mention of *Editor and Publisher*, chief journal of the newspaper press. Critical magazine articles are almost all omitted; and the section on "The Trade and Periodical Press" is rather absurd in its inadequacy. "Present Status of Radio" overlooks magazine discussions in the past few years, and omits mention of National Committee on Radio in Education, probably the most important single source of critical material.

"Studies of Technique in Particular Fields" seems less inclusive than its general heading of "Strategy and Technique of Opinion Management." At least there are almost no critical or questioning references.

There is no sub-heading for "health," "social welfare," or "social work," but

under "Business" along with commercial advertising we find listed two books by the Routzahns!

Notwithstanding what is not there, the book is well worth having. It might be brought to the attention of various local groups having program sessions or discussion meetings.

What Editors Say—Many editorials on health and other welfare topics merit a wider audience and a longer life than comes with their original publication.

Some 46 editorials have been collected in "Editorial Opinion and Social Work," a 17 page pamphlet. Health is the subject of editorials from *Collier's*, *New York Times*, *Honolulu Star Bulletin*, *Miamisburg, Ohio, News*, and *Springfield, Ill., State Journal*. There are quotable sentences for use in your own copy. Editorial writers would be interested in seeing what others have written.

Issued by Social Work Publicity Council, 130 East 22d St., New York, N. Y. 25 cents; special price for quantity.

Health Education in New York City—One of the few examples of community-wide consideration of health education is promised by the reorganized Health Education Section of the Welfare Council of New York City. The executive committee: D. B. Armstrong, M.D., Mrs. K. Z. Whipple, Savel Zimand, C. F. Bolduan, M.D., Iago Galdston, M.D., G. M. Galloway, G. T. Palmer, D.P.H., Marguerite A. Wales.

Jane M. Hoey is secretary of the Health Division, Welfare Council, and Valeria McDermott is Assistant Secretary.

What Is In Hygeia, November, 1934—Among the topics presented:

Foot twisting and faith healing . . .
Tuberculosis and the kings of France . . .
The story of local anesthesia . . . Pre-

venting arthritis . . . The parent, the dentist and the child . . . Prenatal care . . . Dainties for the diabetic . . . The myth of the average child . . . The body louse . . . Poisoning in industry . . . The doctors of Dickens . . . Selling vegetables to the family . . . The a b c of proper brushing . . . If your child is overweight . . . What you should know about eye-glasses . . . Dental dens (quacks) . . . Solving health educational problems . . . New books on health . . . Questions and answers.

NEW OR RENEWED

Bulletin, Mass. School Dental Assn., issued by Massachusetts Dept. of Public Health, Boston, Mass.

The *Monthly Bulletin*, Indiana Division of Public Health, Indianapolis, has been revived under editorship of Thurman B. Rice.

TEACHING OR TALKING

Health and education agencies through the New Jersey State Normal School at Newark are offering an accredited course in "Principles of Dental Health Education," by Dr. J. M. Wisan.

The Junior League conducted a Welfare Conference in Minneapolis, Oct. 15-19, 1934. Public Health was represented on the program by several round tables, addresses and field trips.

Three institutes on health education in secondary schools were conducted this fall by Massachusetts Tuberculosis League in coöperation with the State Dept. of Public Health.

WHAT AND HOW

"The Educational Objective of Public Health Nursing," by M. Lindeburgh. *Canadian Public Health Journal*, 105 Bond St., Toronto 2, Ontario. 35 cents. "How shall we educate or prepare the public health nurse that she in turn may educate the public?"

"Interpreting Health Education," by Ruth Ware, discusses Y.W.C.A. services in relation to association and community chest budgeting. It emphasizes

interpretation of the program to board members, association members, and "the community at large." *Womans' Press*, 600 Lexington Ave., New York, N. Y. Oct., 1934. 20 cents.

A sampling of health articles in *Red Cross Courier*: "How Safety Came to Civil Works"; "Adequate Schools Aid Development of Water Program at Home"; "Hospital Guild Sponsors Home Hygiene"; "Folk Lore Treatments Disappear When Case Worker Talks on First Aid"; "The Schoolhouse on the Hill" (country home hygiene class).

TO HAVE OR TO USE

A feature of the scientific exhibits at the American Medical Assn. and the American Public Health Assn. conventions was a series of charts reproduced in a pamphlet entitled "Progress in Public Health Since 1900," with an introduction by Dr. L. I. Dublin. Some titles: "Diphtheria a vanishing disease"; "Longer life for more people"; "The mounting death toll from cancer"; "Reducing the hazards of early infancy." Metropolitan Life Insurance Co., 1 Madison Ave., New York, N. Y. 12 pages. *Free*.

An appeal for the support of private health agencies was issued Nov. 1 by Col. Theodore Roosevelt, president of the National Health Council. Although given out for immediate effect in the fall Mobilization for Human Needs the statement should be useful locally throughout 1934-1935 in money raising efforts. Address the Council at 50 West 50th St., New York, N. Y. *Free*.

"Children's Bureau and Other Publications Relating to Children." Price list 71 of government publications. Supt. of Documents, Washington, D. C. 15 pages. *Free*.

"A Directory of Organizations in the Field of Public Administration" is a 2d edition. Describes briefly 500

national organizations, public and private, including health and others of interest to health workers, and many others. There are listed more than 1,400 state, regional and Canadian associations. 192 pages; paper covers. \$1.00. Public Administration Service, 350 East 58th St., Chicago, Ill.

"The Need for a More Adequate Program of Maternal Care," by F. C. Rothert, M.D. Reprint. *Public Health Nursing*, 50 West 50th St., New York, N. Y. 10 cents.

"The School and Tuberculosis," by W. P. Brown. *Hygeia* reprint. Address author, State Education Dept., Albany, N. Y. *Free*. Adequate examinations and follow-up.

"Suggestions for Organizing a Community Social Hygiene Program." American Social Hygiene Assn., 50 West 50th St., New York, N. Y. 10 cents.

In *Milbank Memorial Fund Quarterly*, 40 Wall St., New York, N. Y. (Oct., 1934; 25 cents):

"A Project in Rural School Health Education," by Ruth E. Grout. The third paper by the director of health education in Cattaraugus County.

"An Organized Community Health Education Program," by Savel Zimand. Largely based on the Bellevue-Yorkville experience.

"Public Health in Rural Reconstruction at Ting Hsien," by C. C. Ch'en. Includes brief statement on health education.

Reprints from *Journal of Social Hygiene*, 50 West 50th St., New York, N. Y. (10 cents each):

"Social Hygiene Education in a City of Medium Size," by J. B. Pinney.

"Popular Health Education in Simplest Terms," by M. S. Edwards. Social hygiene education for Negroes.

"Milk for Men," and "Good Nutrition and Colds," in Dairy Council Digests, National Dairy Council, Chicago, Ill. *Free*.

"Sunkist Food Bulletins — 1935 Series." Calif. Fruit Growers Exchange, Los Angeles, Calif. For "food teachers and nutrition workers."

MAGAZINE ARTICLES

What do any of us do to call attention to any magazine articles we believe would be of value to staff members, or to other groups, or to the general public?

"Making School Lunch-boxes Appealing," by D. Kirk. *Literary Digest*, 354 4th Ave., New York, N. Y. 10 cents. Variety adds joy and health values.

"Better Food for the College Man," by H. Ripperger. *New York Times Magazine*. Sept. 23, 1934.

"Brevities of 1934." Editorial page. *Collier's*, Sept. 15, 1934. "We shall be a healthier, more vigorous people."

"California's Medical Mix-Up," by P. K. Brown, M.D. *Survey Graphic*, 112 E. 19th St., New York, N. Y., Sept., 1934. 30 cents. "Description of California's trials, mistakes and progress in putting essential medical care within reach of her citizens."

"Catholics on Birth Control," by G. I. Burch. *New Republic*, 421 W. 21st St., New York, N. Y. Sept. 5, 1934. 15 cents. "The crusade of the Roman Catholic Church against the birth-control movement has suddenly turned into a duel over methods."

"Sanctified Birth Control," by D. D. Bromley. *Nation*, 20 Vesey St., New York, N. Y. Sept. 26, 1934. 15 cents. The "safe period"; some of the evidence for and against.

"Birth Control and the Depression," by D. B. Bromley, *Harper's*, 49 East 33d St., New York, N. Y. Oct., 1934. 40 cents. Milbank and other statistics; unwanted children chief depression sufferers; medical profession and Catholic Church—both changing face.

"For Legalized Birth Control." *New Republic*, 421 West 21st St., New York, N. Y. 34 pages. 25 cents. The abortion problem; contraceptive devices and antiseptics; where to get advice.

"In Sickness and in Health," by K. Crichton. *Collier's*. Oct. 20, 1934. "Something is wrong. Millions of Americans are without medical care while thousands of doctors, dentists and nurses are without adequate incomes."

"Sound Facts about Constipation," by W. W. Bauer, M.D. *American Mercury*, 730 Fifth Ave., New York, N. Y., Oct., 1934. 50 cents. "Each man and woman should be a law unto himself or herself," and why.

"Sparing the rod," by J. Ruhrah, M.D. *Today*, 152 West 42d St., New York, N. Y. 10 cents. "Many of those who were raised by the rod have escaped both penitentiary and the hospital for the insane."

RADIO

Education by Radio will keep you in touch with the efforts to secure adequate broadcasting time for education and other non-commercial interests. The publisher is National Committee on Education by Radio, 1201 16th St., N. W., Washington, D. C. Will be sent free upon request.

"Second Series of Radiologs—Radio Talks on Preventive Medicine." Virginia Dept. of Health, Richmond, Va. 68 pages. Free. Topics range from "Adenoids" to "Why pioneers had no pellagra."

The fifth radio contest has been announced by Minn. Public Health Assn., 11 West Summit Ave., St. Paul, Minn. The subject: "Youth Takes a Look at Its Greatest Enemy." The awards: Gold medals to the authors of the 10 best manuscripts, and a trip to Minneapolis to broadcast the talks.

The Health Department of New York City carried on a series of summer health broadcasts for children, having asked the teachers and principals before vacation to tell the children about the radio series. As a special attraction, famous athletes were on the programs—Gene Tunney being the first.

BOOKS AND REPORTS

Symposium on Silicosis — *Trudeau School of Tuberculosis, Saranac Lake, N. Y., June 18–22, 1934. Wausau, Wis.: Employers' Mutuals.* 98 pp. Price, \$5.00.

This is a printed, but unofficial, transcript of the papers and discussions held informally in connection with the symposium referred to in the title. Several who attended the sessions, which were substituted for one week of the regular 1934 course in the Trudeau School, took elaborate notes and the present compend represents the collection and editing of same under B. E. Kuechle of the Employers' Mutuals. The galley proof was submitted to the various speakers to review and correct, which they did. The introduction was written by Dr. Leroy U. Gardner, Director of Saranac Laboratory.

The subjects covered and their authors include: The Etiology of Silicosis, by Dr. Roy R. Jones, U. S. Public Health Service; Dust Concentration and Methods of Measurement, by Donald E. Cummings, Saranac Lake; Pathology, Human and Experimental, by Dr. L. U. Gardner, Saranac Lake; Occupational History, by Donald E. Cummings; Clinical Aspects and Physical Findings, by Dr. Henry H. Kessler, New Jersey; Roentgenological Findings, by Dr. H. L. Sampson, Trudeau Sanatorium; Roentgenological Diagnosis, by Dr. H. K. Pancoast, Philadelphia; Engineering Methods of Prevention, by Prof. Philip Drinker, Harvard; Medical and Legislative Measures of Prevention, by Dr. A. J. Lanza, Metropolitan Life; Fibrosis in Lung Disease, by Dr. William S. McCann, Rochester.

In brief, the volume comprises the latest views of the specialists named,

each of whose informal papers is followed by a compact statement of the discussion which ensued.

Due probably to the nature of note-taking, some parts show much said in short, terse sentences so that the meaning may be ambiguous, but there is a wealth of valuable views and summaries of experimental facts, conclusions and observations. The comprehensive outline by Gardner on the pathology of the subject is superb and in itself may be said to condense volumes.

While there may be some comment about the price asked for this little volume, the entire proceeds are to be given to the Saranac Laboratory for research on silicosis—which, while probably the most definite of all afflictions of truly occupational nature, is today the most controversial as to cause, course, complications, and prognosis. Whence, carefully controlled work from an institution like Saranac should be awarded every financial support. The monograph is truly indispensable to any who are interested in the silicosis question.

EMERY R. HAYHURST

Mothers' Guide When Sickness Comes—By Roger H. Dennett, M.D., and Edward T. Wilkes, M.D. Garden City, N. Y.: Doubleday, Doran, 1934. 400 pp. Price, \$2.50.

This book, written by two well known specialists in diseases of children who have had a wide clinical as well as administrative experience, contains a wealth of information which every mother should have available. As stated in the preface, it is not intended to take the place of the doctor, but to aid in carrying out his orders.

The material is divided into four parts, Part I perhaps being the most useful as to the general information which the average mother should have. While all the chapters are good, we especially recommend those on sunshine and milk. Part II considers Infectious and Contagious Diseases, with a discussion on prevention and treatment of those which are incident to childhood. Part III is devoted to Other Common Ailments, such as prickly heat, ringworm, eczema, hives, ivy poisoning, thrush, etc. Part IV contains valuable instructions and advice for caring for the sick child, such as Common Practical Nursing Procedures, a Poison and Antidote Table, Special Diets, Weight-Height Tables, and a glossary. A good index adds to the value of the volume.

There is always some danger that mothers may carry the use of such a book too far, in spite of the warning by the authors that it is not intended as a substitute for the doctor. During times of depression, such as we are going through, this danger is more acute than usual. In view, however, of the delay in sending for a physician so often encountered even in cities where clinics abound, the sound advice given will doubtless aid many and even save lives.

The book is written in a pleasing style which is easily understandable. At the beginning of each chapter we find an appropriate quotation from well known and favorite writers. This excellent work can be heartily recommended and we wish for it a wide circulation. MAZÛCK P. RAVENEL

The Biology of the Protozoa—By G. M. Calkin (2nd ed. rev.) Philadelphia: Lea & Febiger, 1933. 607 pp., 233 figs. Price, \$7.50.

This new edition of Professor Calkins' book has in it many features of value to workers in public health among which are the following: a

full account of the structure, life history, physiology, and reproduction of the protozoa; a chapter on parasitic protozoa of the vertebrates, especially of man, with colored plates of the three species of the parasite, *Plasmodium*, causing malaria; and a detailed account of the classification of the Protozoa with many illustrations of various kinds of Protozoa. No laboratory should be without this valuable source of information in this important field.

C. A. KOFORD

The Family—By M. F. Nimkoff, Ph.D., under the editorship of William F. Ogburn, Ph.D. Cambridge: Houghton Mifflin, 1934. 526 pp. Price, \$3.00.

In view of the marked increase in courses on the family in colleges and the more general recognition of the important position occupied by the family in the social and economic reconstruction, a comprehensive treatment of this subject is timely. As the editor points out, the family has always been a major social institution and until recent times our chief economic unit. But the change which is taking place in family life is making it a different institution than formerly. The book is well balanced, filled with the latest scientific contributions, and clearly written.

The twelve chapters deal with the structure, functions, and early development of the family—biological, economic, and psycho-social aspects, including the child and the marriage relation, family disorganization and reorganization. Influences of colonization, of industrial revolution and of urbanization are considered. Chapters dealing with the biological and economic aspects will be of special interest to public health administrators. Problems of maternal and infant mortality, abortions and illegitimacy are briefly considered, as well as population changes. Students and teachers in several fields

will find this a very useful volume. To executives of health and social agencies, it should prove exceedingly helpful for reference purposes. IRA V. HISCOCK

La Lèpre—By E. Jeanselme. Paris: G. Goin & Cie, 1934. 679 pp. 259 figs. 14 col. plates.

Professor Jeanselme, who has contributed materially to our present knowledge of leprosy, has written a thorough-going treatise on leprosy which has appeared as a monumental volume published with aid of the French Government. It was not intended to be a complete compilation of the literature, for there already was such a work; it was to be more personal and critical. Nevertheless, the presentation is far from being dogmatic, and in fact it is sometimes difficult to ascertain precisely what the author's views are. Most questions are fully covered, with much attention to the literature, so that the book is replete with citations and footnote references.

The first of the 15 chapters, the definition of leprosy, covers but a half page. The second, a 4 page table of words signifying leprosy and related terms, is doubtless the most complete list of the sort yet compiled. The same assiduity of compilation is seen in the fourth section, on geographic distribution; it follows one on history, which, beginning with the Bible and earlier documents and coming up to the Manila and Bangkok conferences of 1930-1931, reflects the author's recognized historical bent.

Bacteriology, the first of the technical subjects, is dealt with in a comprehensive chapter in which the attempts at cultivation, held by the author to have been unsuccessful as regards transplants in series, are summarized in periods. The first of these, before 1900, is properly dismissed very briefly; of the most recent reports, those of Wherry (1930), and of Soule and Mc-

Kinley (1932) have been overlooked. A few pages on rat leprosy, based largely on the numerous reports of Marchoux and his colleagues, follow a discussion of the attempts to transfer the human infection to animals. Serology is dealt with adequately in view of the unsatisfactory status of the matter, but the section on immunity and allergy reflects the small amount of attention that has been given this aspect of the problem.

"General pathology" is a short chapter, but that entitled "anatomoclinical study," which covers both the clinical and pathological features, fills more than 200 pages. Illustrating them are a number of colored plates, most of them representing microscopic specimens, that are exceptionally fine. There is a long chapter on etiology followed by short ones on the evolution of the disease and prognosis. Diagnosis is given more space and prophylaxis much more. Treatment is a most important chapter. The author holds that there is no specific remedy but that amelioration, and perhaps cure, is possible by means of a course in which parts are taken by personal hygiene, care of complicating conditions, and special agents, the last referring particularly to chaulmoogra medication.

It is impracticable to attempt to set forth here more than a few of the author's views, but all of them are entitled to consideration. Unfortunate features of the book are, its size and weight—nearly 13 x 10½ inches over all, and weighing nearly 10 pounds—and the lack of an index, its place being occupied by a topical summary more appropriate for the front of the book. It would be unfortunate if these features, or its cost, should serve as deterrents to its general use, for it is a really valuable work and should be in all medical libraries and in the hands of all who are doing serious work in leprosy.

H. W. WADE

Benjamin Rush. Physician and Citizen, 1745-1813—By *Nathan G. Goodman*. Philadelphia: University of Pennsylvania Press, 1934. 421 pp. Price, \$4.00.

Doubtless many will be as surprised as was the author of this book, to discover that there existed no biography of Rush, in many ways the most distinguished of early American physicians—"The American Sydenham," as he has been called. The public and the medical profession owe to the author a peculiar debt of gratitude for the present volume, written some 120 years after the death of this distinguished man.

The work has all the earmarks of a labor of love. It is well documented and is a mine of information concerning the early days of our country, the Revolutionary War, and some of the master minds who laid the foundation on which the medical profession of America stands today—unsurpassed by any in the world. From the medical standpoint, the book is particularly interesting in its account of the epidemics of yellow fever in Philadelphia, especially the great epidemic of 1793. Though this led Rush into a bitter controversy, it shows him to have been a master mind. He apparently believed for some time in the contagiousness of yellow fever, but abandoned this idea and charged its origin to local conditions. This brought upon him bitter attacks, some even going so far as to declare him insane. His practice during the great epidemic was enormous. His treatment was bleeding and purging, an idea he obtained from Dr. John Mitchell, who wrote on the disease in 1744. He held that the lives of 6,000 Philadelphians were saved by this treatment. While we cannot accept Rush's ideas, "there was something heroic as well as deeply spiritual about his labors." On one occasion he said, "Thank God, out of the hundred patients I have visited or prescribed for this day, I have lost none."

Rush was a most remarkable man, and one wonders how he could engage in so many activities and show mastery in all. He was most interested in the abolition of slavery, the abolition of death penalty, and restriction in the use of alcohol and tobacco. He was president of one of the first cotton mills in America, in 1775, feeling it necessary on account of the embargo on the importation of British goods, to provide for the needs of Americans in this line. He was the founder of the first free dispensary, the first temperance and anti-slavery societies, the first Sunday School system, one of the founders of the College of Physicians, active in the foundation of Franklin and Marshall College and of Dickinson College. He was the first American psychiatrist and the first professor of chemistry, having been appointed in 1789 to that chair in the College of Philadelphia, completing the faculty of the first medical college in America. In April, 1777, he was appointed Surgeon General of the Medical Department of the Continental Army. Unfortunately, apparently owing to his friendship for Generals Gates and Conway, he became involved in the Conway Cabal. Wrong as he was, and though a bitter critic, he was a patriot and never a conspirator. He also was ruthless in condemning Dr. William Shippen, Director-General of the medical department.

Rush made some remarkable medical observations. He was among the first to recognize the relationship between infected teeth and arthritis, and in his treatment of chronic diseases, examined the teeth and extracted the decayed ones. He gives a number of cases in which severe systemic disease was entirely cured by getting rid of the focal infection. This was done approximately 130 years ago, yet the influence of focal infections is generally considered one of our recent discoveries due to bacteriology. It is most interesting also to

note his introduction of the Suttonian system of inoculating against smallpox, to which he attributed a great increase in his practice. This restricted the inoculation to a small puncture instead of the then popular long incision, and may be regarded as the distinct predecessor of the modern method of performing the Jennerian vaccination. However, as soon as Jenner announced his discovery, Rush became a convert.

We wish we were able to speak at greater length of this remarkable man, but the book must be read to obtain anything like a fair appreciation of him. We cannot do better than close with two quotations:

His character was laid upon foundations of integrity and service, and once he was sure within himself of the soundness and morality of his stand, he resolutely refused to compromise. He would not yield an inch even to gain a foot; and therefore he was doomed to meet defeat and condemnation many times when he deserved better. Furthermore, his candid self-righteousness only aggravated his adversaries and made him deaf to reason as well. It was a tragic contradiction of Rush's life that his stubborn individualism obscured the originality of his mind, the attractiveness of his personality, and the honesty of his motives.

Benjamin Rush was a leader in many fields: he was a great physician, a talented teacher, a competent scientist, an able organizer, a felicitous writer, a vigorous social reformer, an earnest philanthropist, a creative scholar, and a devoted patriot.

MAZŮCK P. RAVENEL

Diphtheria. Past and Present—*By J. Graham Forbes, M.D., Principal Assistant Medical Officer, London County Council; Late Milroy Lecturer, Royal College of Physicians. London: John Bale, Sons & Daniels-son, Ltd., 1932. 832 pp. Price, \$15.00.*

This monumental work has as its basis the Milroy Lectures of the Royal College of Physicians for 1929. There was considerable delay in publication, and many additions were made.

The book is a veritable encyclopedia of pretty nearly everything which science and experience have taught us concerning diphtheria—Etiology, Distribution, Transmission, and Prevention, each of which forms a section of the book. Much space is given to the distribution in England and Wales, which is of more interest to the inhabitants of the British Isles than to Americans though necessarily there is much in the survey which is applicable to many parts of the world. However, reviews are given of the situation in the United States, Canada, South America, and Germany, though the chief consideration of these surveys is preventive work. A conclusion sums up the matter in a very satisfactory way. This is followed by a good general index, a geographical index, and a list of the authors quoted, all of which make the book easy to use and will serve for the student as a source book.

During the past 2 years we have learned much about new materials for the prevention of diphtheria. Toxin-antitoxin, toxoid-antitoxin, toxoid-antitoxin floccules, and toxoid (anatoxin) are discussed. In America the alum precipitate is gaining ground rapidly. With this exception, the methods described, discussed and evaluated by the author are up to date.

The author is well known and his official position has given him unusual opportunity for mastering the subject of which he treats.

The book has an introduction by Sir Frederick Andrewes. The work is not only voluminous but every item is well considered and treated with the conservatism and sound judgment which characterize English scientists. It can be recommended most heartily to health officers, physicians in general, and all who are interested in the various phases of the diphtheria problem, though it is not suitable for popular reading.

MAZŮCK P. RAVENEL

Child Guidance Clinics—By George S. Stevenson, M.D., and Geddes Smith. New York: The Commonwealth Fund, 1934. 186 pp. Price, \$1.50.

One of the most interesting, though relatively unfamiliar developments of the 20th century has been the child guidance clinic. The average public health worker is somewhat at a loss to evaluate it. Hence this succinct story of the origin, development, and present status of the clinics, published by the Commonwealth Fund which has had such a large share in its life, is worth the reading by everyone interested in the progressive welfare movements of the day.

The book opens with an orienting chapter on child guidance. Then, after a chapter devoted to backgrounds, there is a discussion of the "pioneer clinics," in which, among that of others, Dr. Healey's work in Chicago and Boston receives sympathetic consideration. Chapter four is devoted to the story of the demonstration clinics conducted by the National Committee for Mental Hygiene and financed by the Commonwealth Fund. These are covered individually and in some detail, with special reference to the part each played in furthering the development of the child guidance principle.

The latter part of the book is devoted to what is called "the present pattern" and a discussion of Trends and Possibilities. This is the part which will appeal most to the general child hygiene worker since we all are interested in the future of this kind of approach to the problem of the child who may be headed for delinquency or mental disease.

The authors are eminently fair in their discussion of the possibilities of the clinic. They do not minimize its relatively large cost and limited facilities. They feel that "the hypotheses on which the child guidance clinics base

their program are still fluid"; hence the impossibility at present of offering definite rules for the instruction of the non-psychiatric worker. This is of course a sound position to take, though disappointing undoubtedly to many.

It would seem to be a fair conclusion that private agencies should continue to finance child guidance clinics during their experimental years, if not longer. One might venture the opinion that, in view of the relatively large staff and expense involved as compared with the relatively small group of children which can be handled effectively, these clinics for a long time to come should be thought of as laboratories and, perhaps, teaching centers rather than as clinics in the ordinary acceptance of the word.

MERRILL E. CHAMPION

Hygiene and Home Nursing—By Louisa C. Lippett, R.N. Yonkers, N. Y.: World Book Co., 1934. 424 pp. Price, \$1.24.

It is somewhat of a disappointment to find such attractive covers enclosing rather trite and unimaginative material and such well printed pages including information which is not quite up-to-date. The discussion of underweight and overweight does not consider the newer ideas of the importance of growth rather than comparison with a standard. Posture becomes in this book a matter of exercises rather than an evidence of good mental and physical health. The chapter on tuberculosis is scarcely complete since it leaves out the entire topic of tuberculin testing, regarding which it is especially important that lay people be informed. Soap is not mentioned as a disinfectant although far less simple and more uncommon disinfectants are suggested in the care of communicable disease cases.

We had hoped to find in such a textbook for high school girls interesting suggestions for finding information and trying out some new adventures in

health. Instead we find only good but prosaic questions at the end of each chapter and no suggestions for reference reading.

Many women and girls would find the terms confusing and would find difficulty in adapting some of the technics to the home. The book is written from

the standpoint of the graduate nurse rather than from that of the home maker.

The descriptions of anatomy and physiology are clear and quite interesting and could be used to supplement less simple material.

VIRGINIA A. JONES

A SELECTED PUBLIC HEALTH BIBLIOGRAPHY WITH ANNOTATIONS

RAYMOND S. PATTERSON, PH.D.

What the Public Wants—Invited to send in questions to be answered in a radio health forum or in a newspaper substitute, the public showed its interest in disease rather than health. After many unsuccessful attempts to curb the appetite for information about pathological conditions, the question and answer method was dropped.

CHADWICK, H. D., and LOMBARD, H. L. *The Health Forum*. *New Eng. J. Med.*, 211, 17:767 (Oct. 25), 1934.

About Amebic Dysentery—The epidemiology of amebiasis differs little from that of other food and water-borne diseases. Important factors in successful epidemiology in this disease are the recognition of its prevalence and a thorough understanding of its nature and transmission. This is one of several excellent papers constituting a symposium on the subject.

CRAIG, C. F. *The Epidemiology of Amebiasis*. *J.A.M.A.*, 103, 14:1061 (Oct. 6), 1934.

Some Considerations About Health Insurance—Administrative problems which any project in insured medical care must face are set forth to suggest that pioneering in this social field must be guided by critical appraisal and research.

DAVIS, M. M. *Sickness Insurance and Medical Care*. *Milbank Quart.*, 12, 4:287 (Oct.), 1934.

Vaccination at Birth—Vaccination of the new-born baby is a practical procedure, though the newly-born child is resistant to infection with the virus. It need not be done at birth if it can be assured at 3 to 6 months.

DONNALLY, H. H.; and NICHOLSON, M. M. *A Study of Vaccination in Five Hundred New-born Infants*. *J.A.M.A.*, 103, 17:1269 (Oct. 27), 1934.

In Which Families Does Case-Finding Pay?—Accurately kept records indicate that it costs so much to discover adult type tuberculosis by tracing tuberculin positive groups of children that intensive case-finding seems uneconomic. However, this is not true of active pulmonary or tuberculous meningitis cases. These should have prompt follow-up.

EDWARDS, H. R., and UNZICKER, G. *A Cost Analysis of Clearing Tuberculosis Family Contacts*. *Milbank Quart.*, 12, 4:306 (Oct.), 1934.

Spreading Scarlet Fever—Patients with uncomplicated cases of scarlet fever may be as dangerous carriers as those with complications. The authors believe that quarantine, of any length,

will not control scarlet fever and that the hope lies in active immunization.

HOYNE, A. L., and BAILEY, J. H. The Secondary Case of Scarlet Fever. *J.A.M.A.*, 103, 14:1051 (Oct. 6), 1934.

Expanding Conception of School Child Hygiene—Ten factors in the success of the school health program are considered in some detail to present a useful bird's-eye-view of school child health administration.

IRELAND, I. G. Essentials of the School Health Program. *J. Health & Physical Education*, 5, 7:15 (Sept.), 1934.

A Slow Start for a Long Race—These are significant findings: the rat's life span is extended if the animal growth is retarded by inadequate calories (but sufficient essential nutrients) in youth.

McCAY, C. M., and CROWELL, M. F. Prolonging the Life Span. *Scient. Month.*, 39, 5:405 (Nov.), 1934.

Psittacosis Highly Infectious — The story of 11 laboratory workers who came down with psittacosis illustrates the unusual infectiousness of the disease, for only 2 were in contact with infected birds, though all were in the same building.

McCoy, G. W. Psittacosis Among the Personnel of the Hygienic Laboratory. *J. Infect. Dis.*, 55, 2:156 (Sept.-Oct.), 1934.

Rural Health Yardstick — This survey of a rural health administrative unit to determine the health problems of the peoples involved, the quality and quantity of service rendered, the relationship of the program to the needs of the community, and the specific effect, if any, upon individual health, should prove a most valuable measure of this still largely unsolved problem. The

answers will be found in subsequent papers to appear in series.

MOUNTIN, J. W. Effectiveness and Economy of County Health Department Practice. *Pub. Health Rep.*, 49, 42:1232 (Oct. 19), 1934.

Against Tuberculosis Vaccination — Further improvement in tuberculosis mortality rates must come through better epidemiology not vaccination, asserts the author in reviewing the history of tuberculosis immunization.

PETTORI, S. A. Anti-Tuberculosis Vaccination. *New Eng. J. Med.*, 211, 15:677 (Oct. 11), 1934.

Controlling Gonorrhea and Syphilis—Epidemiology and health education, the hare and the tortoise of all communicable disease prevention, are summarized in their applicability to venereal disease control. A stimulating paper.

STOKES, J. H. Public Health and Social Hygiene. *Pub. Health Nurs.*, 26, 10:535 (Oct.), 1934.

Athletes' Hearts—Enlarged hearts were found in about half the ricksha pullers examined, a condition appearing to be a physiologic response to rapid exertion carried on daily for years. There is no indication that the resulting enlargement predisposes to disease.

TUNG, C. L., et al. The Hearts of Ricksha Pullers. *Am. Heart J.*, 10, 1:79 (Oct.), 1934.

Telling 'Em About Health—Analyzing the elements of a community health education program, the author presents a useful check to be used to measure any community project in health promotion.

ZIMAND, S. An Organized Community Health Education Program. *Milbank Quart.*, 12, 4:329 (Oct.), 1934.

BOOKS RECEIVED

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- POPULATION THEORIES AND THEIR APPLICATION, WITH SPECIAL REFERENCE TO JAPAN.** By E. F. Penrose. Stanford University, Food Research Institute, 1934. 347 pp. Price, \$3.50.
- DYNAMICS OF POPULATION.** By Frank Lorimer and Frederick Osborn. New York: Macmillan, 1934. 461 pp. Price, \$4.00.
- A SHORT HISTORY OF SOME COMMON DISEASES.** Edited by W. R. Bett. New York: Oxford University Press, 1934. 211 pp. Price, \$3.50.
- YOUR MEALS AND YOUR MONEY.** By Gove Hambridge. New York: McGraw-Hill, 1934. 190 pp. Price, \$1.50.
- HEALTHY BABIES ARE HAPPY BABIES.** A complete Handbook for Modern Mothers. By Josephine Hemenway Kenyon. Boston: Little Brown, 1934. 321 pp. Price, \$1.50.
- INSTITUTIONAL CARE OF MENTAL PATIENTS IN THE UNITED STATES** By John Maurice Grimes. Chicago: Author, 1934. 138 pp.
- WEBSTER'S NEW INTERNATIONAL DICTIONARY.** 2nd ed. Unabridged. Springfield, Mass.: G. & C. Merriam Co., 1934. 3210 pp. Price, \$20.00. Buckram binding.
- HEALTH WORKBOOK FOR COLLEGE FRESHMEN.** By Kathleen Wilkinson Wootten. New York: Barnes, 1934. 220 pp. Price, \$1.50.
- YOU CAN MASTER LIFE.** By James Gordon Gilkey. New York: Macmillan, 1934. 186 pp. Price, \$1.75.
- THE MODERN HOME PHYSICIAN.** A New Encyclopedia of Medical Knowledge. By Victor Robinson, Editor. New York: Wise, 1934. 728 pp. Price, \$3.50.
- MENTAL HYGIENE FOR EFFECTIVE LIVING.** By Edwin A. Kirkpatrick. New York: Appleton-Century, 1934. 387 pp. Price, \$3.00.
- DOCUMENTS OF AMERICAN HISTORY.** Edited by Henry Steele Commager. New York: Crofts, 1934. 454 pp. Price, \$4.00.
- COMMUNITY HYGIENE.** A Text Book in the Control of Communicable Diseases. By Laurence B. Chenoweth and Whitelaw Reid Morrison. New York: Crofts, 1934. 317 pp. Price, \$2.50.
- CHILDREN OF THE PRESCHOOL AGE.** By Ethel Kawin. Chicago: University of Chicago Press, 1934. 340 pp. Price, \$3.50.
- TEXTBOOK OF MATERIA MEDICA AND THERAPEUTICS.** 6th ed. By A. S. Blumgarten. New York: Macmillan, 1934. 791 pp. Price, \$3.00.
- INDUSTRIAL MALADIES.** By Sir Thomas Legge. New York: Oxford Press, 1934. 234 pp. Price, \$4.25.
- ALLERGY AND APPLIED IMMUNOLOGY.** 2nd ed. By Warren T. Vaughan. St. Louis: Mosby, 1934. 420 pp. Price, \$5.00.
- HEALTH STORIES.** Book Two. By Anna B. Towse, Florence E. Matthews and William S. Gray. New York: Scott, Foresman & Co., 1934. 176 pp. Price, \$68.
- HEALTH AND HAPPINESS SERIES.** Health in Good-Habit Land, Pathways in Healthland and Highroads to Health. Revisions of the first three books of the Health and Happiness Series by S. Weir Newmayer and Edwin C. Broome. New York: American Book Co., 1934. Price, \$.64, \$.72, and \$.84 respectively.
- THE PATIENT AND THE WEATHER.** Volume III. Mental and Nervous Diseases. By William F. Petersen. Ann Arbor: Edwards Bros., 1934. 375 pp.
- HEREDITY AND DISEASE.** By Dr. Otto Mohr. New York: Norton, 1934. 253 pp. Price, \$3.50.
- HANDBOOK OF CHEMISTRY.** Compiled and Edited by Norbert Adolph Lange. Sandusky: Handbook Publishers, 1934. 1545 pp. Price, \$6.00.
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- BIG PROBLEMS ON LITTLE SHOULDERS.** A Grownup's Guide to a Child's Mind. By Carl Renz and Mildred Paul Renz. New York: Macmillan, 1934. 129 pp. Price, \$1.50.
- MATERNAL MORTALITY IN PHILADELPHIA, 1931-1933.** Report of Committee on Maternal Welfare. Philadelphia County Medical Society, 1934. 143 pp. Price, \$1.00.
- DIABETIC MANUAL FOR PATIENTS.** 2nd ed. By Dr. Henry J. John. St. Louis: Mosby, 1934. 232 pp. Price, \$2.00.
- RULES FOR RECOVERY FROM PULMONARY TUBERCULOSIS.** 6th ed. By Lawrason Brown. Philadelphia: Lea & Febiger, 1934. 275 pp. Price, \$1.75.
- SYNOPSIS OF GENITOURINARY DISEASES.** By Austin L. Dodson. St. Louis: Mosby, 1934. 275 pp. Price, \$3.00.
- THE DOCTOR IN HISTORY.** By Howard W. Haggard. New Haven: Yale University Press, 1934. Price, \$3.00.
- PLUNGE IN PURITY WITH SAFETY** (hygienic control of swimming pools). Everson Filter Co., 627 Lake St., Chicago, Ill., 1934. 12 pp. Free.

ASSOCIATION NEWS

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The following individuals have applied for membership in the Association. They have requested affiliation with the sections indicated.

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Board of Health

Child Hygiene Section

Herman S. Gove, M.D., State Board of

Health, Jefferson City, Mo., Director,
Division of Child Hygiene
Edward L. Russell, M.D., Orange County
Health Dept., Santa Ana, Calif., Director,
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Abram L. Van Horn, M.D., State Office Bldg.,
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Director, Health Education Department
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Red Cross Public Health Nursing Service,
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Mary B. Tinsley, Wytheville, Va., Red Cross
Public Health Nurse

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Hyman I. Vener, M.D., 1531 Purdue Ave.,
West Los Angeles, Calif., Member, Attend-

ing Staff, Communicable Diseases Unit, Los Angeles County General Hospital, Unit # 1

Unaffiliated

Mary S. Epstein, M.A., 222 E. 82 St., New York, N. Y., Instructor, Public Health and Hygiene, Hunter College

APPLICANTS FOR FELLOWSHIP

Health Officers Section—Gregoire Fere Amyot, M.B., D.P.H., North Vancouver, B. C.; Reginald M. Atwater, M.D., Dr.P.H., Olean, N. Y.; Ira Otis Church, M.D., C.P.H., Oakland, Calif.; Wilton Lee Halverson, M.D., Dr.P.H., Pasadena, Calif.

Laboratory Section—F. D. Pease, M.D., Missoula, Mont.

Industrial Hygiene Section—Rollo Herbert Britten, A.B., Cherrydale, Va.; William Jacobsohn, M.D., New York, N. Y.; Thomas McCance Mabon, M.D., Pittsburgh, Pa.; Sophie Rabinoff, M.D., New York, N. Y.

Food and Nutrition Section—Marietta Eichelberger, M.S., Ph.D., Chicago, Ill.

Public Health Education Section—Edna A. Gerken, C.P.H., Manila, P. I.; Jacob M. Wisan, D.D.S., Elizabeth, N. J.

Epidemiology Section—G. Foard McGinnes, M.D., Dr.P.H., Richmond, Va.; E. K. Musson, M.D., M.P.H., Jefferson City, Mo.

Unaffiliated—Otto C. Murphy, Kansas City, Mo.; Edward Lacy Pettibone, D.D.S., Cleveland, O.; James Gayley Townsend, M.D., Washington, D.C.; Frances Stern, Boston, Mass.

DECEASED MEMBERS

Jorge Le-Roy, M.D., Habana, Cuba, Elected Member 1911, Fellow 1923

E. Linwood Cornman, V.M.D., Marietta, Pa., Elected Member 1926 (Associate)

Henry A. Cotton, M.D., Trenton, N. J., Elected Member 1932

Charles W. Many, M.D., Doylestown, Pa., Elected Member 1917

Herbert C. Ober, M.D., D.M.D., Newton, Mass., Elected Member 1932

George W. Fuller, New York, N. Y., Elected Member 1915, Fellow 1922.

H. L. Abramson, M.D., St. John, N. B., Canada, Elected Member 1919

Carroll W. Eddy, D.V.M., Cleveland, O., Elected Member 1926

M. B. Harutun, M.D., Joplin, Mo., Elected Member 1920, Fellow 1923

George T. Lennon, Haverhill, Mass., Elected Member 1918

Thomas J. Strauch, Richmond, Va., Elected Member 1919

SOUTHERN BRANCH A.P.H.A.

At its third annual meeting in San Antonio, Tex., November 13-16, the Southern Branch A.P.H.A. elected the following officers:

President, C. E. Waller, M.D., Washington, D. C.

1st Vice-President, V. M. Ehlers, Austin, Tex.

2nd Vice-President, I. C. Riggins, M.D., Richmond, Va.

3rd Vice-President, Ruth Mettinger, R.N., Jacksonville, Fla.

Secretary-Treasurer, G. F. McGinnes, M.D., Richmond, Va.

BACK NUMBERS WANTED

Readers of *The American Journal of Public Health* are asked to send spare copies of the January, 1928, and of the January, 1933, issue to the American Public Health Association, 50 West 50th Street, New York, N. Y., as these issues are out of stock. These will be much appreciated, and reimbursement of postage will be made in each case.

NEWS FROM THE FIELD

THE MICHIGAN PUBLIC HEALTH CONFERENCE

A LARGE and enthusiastic group of health workers gathered at the Hotel Olds in Lansing on November 7, 8, and 9, for the 14th Annual Public Health Conference conducted by the Michigan Department of Health and the Michigan Public Health Association.

By noon on the 7th, 291 persons had registered, although the first session was not scheduled until 2.00 P.M. This was opened by C. C. Slemons, M.D., State Health Commissioner. After a brief welcoming address, he introduced the speaker of the afternoon, Carl V. Weller, M.D., Professor of Pathology at the University of Michigan, who spoke on "Cancer as a Public Health Problem," to an audience numbering more than 400. Thereafter, the assembly divided into specialized groups and attended the arranged round tables for health officers, public health nurses, sanitary officers and laboratory directors.

The interestness of the various audiences was noteworthy, and the emptiness of the hotel lobby and corridors for the entire afternoon provided significant evidence of the pulling power of the programs.

Informal dinner meetings preceded the evening session which was presided over by Chalmers J. Lyons, D.D.Sc., Professor of Oral Surgery at the University of Michigan and a Member of the State Council of Health. Samuel M. Gordon, Ph.D., Secretary, Council on Dental Therapeutics, American Dental Association, was the speaker and his subject was "Mouth Washes and Dentifrices, Their Advertising, and Public Health Work."

Louis J. Hirschman, M.D., Detroit, a Member of the State Council of

Health, opened the Thursday morning meeting promptly at 9.00 A.M. "Welfare Relief in Michigan" was presented by the State Relief Administrator, William Haber. Two papers on Vital Statistics followed, one by W. J. V. Deacon, M.D., the other by T. F. Murphy, M.D. Dr. B. W. Carey, President of the Michigan Public Health Association, delivered the Presidential Address at the luncheon business meeting of the organization.

The afternoon program was devoted to "The Rôle of Nutrition in Public Health." Robert B. Harkness, M.D., Houghton, President of the State Council of Health, presided. The speakers were J. A. Johnson, M.D., Helen S. Mitchell, Ph.D., Lelia McGuire and Don J. Barnes, M.D.

The Conference Dinner on Thursday evening was very well attended. George J. Curry, M.D., Flint, Member of the State Council of Health, was Toastmaster and the speaker was Shirley W. Allen, Professor of Forestry, University of Michigan, on the topic "Fighting Waste with the CCC."

The Friday morning session was given over to a program of miscellaneous technical subjects including tuberculosis, preparation, standardization, and use of alum precipitated toxoid, immunization against poliomyelitis, streptococcic sore throat. Such experts as Drs. Forsbeck, Bunney, Newitt, Littlejohn, Mr. T. J. Werle, Drs. Cummings and Barrett were the speakers.

Held coincidentally with the Conference was a meeting of the Michigan Association of School Physicians, who conducted a luncheon meeting and an afternoon session on school health problems, and of the State Organization of Public Health Nurses.

The Conference adjourned at noon on Friday. Praise and credit go to Dr. Slemons and the members of his staff who assisted him in preparing the program, in making the excellent arrangements and, most particularly, for assembling such a large number of interested and interesting people at a state meeting.

NEW JERSEY HEALTH AND SANITARY ASSOCIATION

THE 60th anniversary of the New Jersey Health and Sanitary Association was observed at Asbury Park on November 16 and 17. A most interesting program had been prepared and a goodly number were there to appreciate it.

On Friday afternoon, two sessions were held, one a General Session at which Russell Van Nest Black, Dr. Allen G. Ireland, and Dr. LeRoy A. Wilkes, F.A.P.H.A., discussed the Planned Development of the State of New Jersey and Its Relation to General Public Welfare, The New Jersey School Health Program, and The Medical Society of New Jersey Organizes to Improve Community Health Services, respectively. In addition, a special session on various problems in sewage disposal was held for the benefit of those concerned.

At the Friday evening session, Dr. Thomas Parran, Jr., F.A.P.H.A., was the guest speaker discussing Health and Medical Relief in New York State. This session was widely attended by both the delegates present at the meeting and interested persons from neighboring towns.

The highlight of the evening session was the presentation of an award in the form of a bronze plaque to Dr. Theobald Smith of Princeton.

An interesting summary of the work of Dr. Theobald Smith appears in the November number of *Health Progress*, the monthly publication of the New

Jersey Health and Sanitary Association.

The Saturday morning session was given over to a round-table discussion of various association projects and an annual business meeting.

DR. THEOBALD SMITH GETS AWARD

ON November 16, the annual award for meritorious service in the fields of medicine and science, given by the New Jersey Health and Sanitary Association, was presented to Dr. Theobald Smith of the Rockefeller Institute, Princeton. It was accepted in absentia by Dr. Carl Ten Broeck, associate director of plant and animal pathology at the institute.

Dr. Smith received the Copley Medal of the British Royal Society last November in recognition of his research into diseases of animals and man. One of his most notable achievements was the discovery that Texas cattle fever was caused by the bite of an infected tick. This led the way to other discoveries of like importance in malaria infections. Dr. Smith also discovered the cause of bovine tuberculosis.

The presentation was made by James E. Brooks of Newark, president of the association. Mr. Brooks reviewed Dr. Smith's 50 years as a physician, teacher, student, and scientist, and called attention to his many achievements for the benefit of mankind and animals. The award was a bronze plaque.

In 1930 Dr. Smith was awarded the Sedgwick Memorial Medal at the A.P.H.A. meeting in Fort Worth, Tex.

\$1,000,000 FERA FUND GOES TO RURAL HEALTH

Federal Service to Aid Units in States—To make more efficient the rural health service in areas severely hit by the depression, \$1,000,000 has been allotted from Federal Emergency Relief funds to the Public Health Service.

"The Public Health Service will give financial aid through state health de-

partments toward the maintenance of existing full-time county or district health units when local funds available are insufficient to provide for adequate health service," a Treasury announcement said.

The service will undertake to establish new full-time rural units when local funds are insufficient to meet the entire cost. It will not contribute to any project in which less than 50 per cent of the cost is borne by state or local authorities.

There are 550 full-time county units, as compared with 16 in 1933. The first unit was organized in 1911 in Yakima County, Wash., State officials at that time asking federal aid in setting up an agency to combat typhoid fever.

"It is estimated that less than 25 per cent of the rural population of the country has the benefit of full-time health service at the present time," the Treasury said.—*New York Times*, Oct. 24, 1934.

RECORD FORMS FOR TUBERCULOSIS SANATORIA

FOR the first time it is now possible for tuberculosis sanatoria to keep uniform and complete records of all material facts about their patients, available at all times for instant consultation. This important improvement in health bookkeeping is a result of 2 years' work done by a committee of the American Sanatorium Association, assisted in a secretarial capacity by members of the staff of the National Tuberculosis Association. The 23 new forms which have been prepared are obtainable from the Livingston Press, Livingston, N. Y.

Forms are numbered and designated, as follows:

1. History—4 pages
- 1A. History
2. Examination
3. Nose, Throat, Ear, and Eye—Teeth
4. Physician's Orders

5. Nurse's Record
6. Weight Chart
7. Temperature, Pulse, and Respiration
8. Laboratory Examinations (Sputum, etc.)
9. Laboratory Examinations (Blood, etc.)
10. X-ray
11. Re-examination
12. Pneumothorax
13. Exercise Chart
14. Heliotherapy
15. Prescription for Physiotherapy
16. Consultation
17. Operations
18. Tuberculous Empyema
19. Permission for Autopsy
20. Admissions—Discharges
21. Statistical Summary on Discharge
22. Blank form (heading only)
23. File folder

DIRECTORY OF HEALTH OFFICERS

THE U. S. Public Health Service has published a Directory of the Full Time County Health Officers in the United States, in *Public Health Reports* for September 28, page 1134, compiled from data furnished by state Health Officers as of Jan. 1, 1934.

Similar directories have been published annually since 1922, except for 1932, when funds were not available.

CHILD LABOR DAY—JANUARY 26-28

THE last week end of January, 1935, has been designated for the observance of Child Labor Day by the National Child Labor Committee, following a custom of nearly 30 years.

The keynote this year will be ratification of the Federal Child Labor Amendment. This Amendment is now before the states for ratification; it is stated to be merely an enabling act specifically empowering Congress to legislate on the subject.

AMERICAN AMBULANCE MAKES DEBUT IN JERUSALEM

OX carts and donkeys as transports for the sick of Jerusalem will give way to a brand new Ford ambulance fully equipped in accordance with New York hospital standards, which has just

arrived in the Palestine capital, according to word received by Hadassah, the Women's Zionist Organization of America.

The ambulance, said to be the first ever to appear in the Holy Land, was consigned to the Rothschild-Hadassah Hospital. It was shipped from New York by Mrs. Rive K. Weinstein, sister of Dr. Ira I. Kaplan, head of the cancer division of the New York Department of Hospitals.

HYGIENE INFORMATION CENTER IN FRANCE

A FREE hygiene information center, the first of its kind in France, was recently opened in a crowded district of Paris by a private physician. The center will give information on such subjects as personal hygiene, housing hygiene, physical exercise, swimming pools, infant and child hygiene, hygiene of work, measures against venereal and other contagious diseases, and health legislation, and will supply the addresses of welfare agencies.

The physicians at the center are prohibited from giving treatment or advice to ill persons.—*Le Nourrisson*, Paris, No. 4, July, 1934.

ROCKEFELLER FOUNDATION

THE Rockefeller Foundation expended for public health work during the year the sum of \$3,286,063.01. It supported laboratories for yellow fever research in Lagos, Nigeria; Bahia, Brazil; and New York City. It completed, in coöperation with various governments of West Africa, an extensive survey which disclosed the areas in Africa where yellow fever occurs; assisted the governments of Brazil and Bolivia in an extensive program of yellow fever control; conducted experiments and studies on the vaccine and virus of yellow fever and on the mosquito vectors of this disease; aided three states in the United States and

seventeen foreign governments in anti-malaria work; carried out malaria studies and surveys in various parts of the world; engaged in studies of hook-worm disease in Palestine, Egypt, Straits Settlements, and Puerto Rico; supported studies of *Endamoeba histolytica*, Rocky Mountain spotted fever, tuberculosis, sprue anemia, filariasis, schistosomiasis, and the diseases affecting the races of the Pacific; aided the government of India in conducting experiments on the disposal of refuse; sponsored studies of statistical epidemiology; contributed toward the development of state and local health services of fifteen European countries, the League of Nations, five Far Eastern countries, the government of the South Pacific Islands, six countries of the Caribbean region, two countries of South America, and the governments of Mexico and Canada; gave assistance to the central health administrations of fourteen states in the United States and to the local health administrations of twenty-three states of the United States, four provinces of Canada, and five areas in Mexico, and provided funds for local health units in fourteen other countries; directed the studies of 197 fellows in public health, thirty-two nursing fellows, and six nurse visitors; provided financial aid to former fellows in carrying out special studies; and contributed toward the support of schools of hygiene and public health and of centers of public health training in Japan, Puerto Rico, Central America, South America, Europe, and the United States.—Excerpt from Report for 1933.

CHANGES IN THE COST OF LIVING, OCTOBER, 1934

THE first decline since April of this year in the cost of living of wage earners in the United States was noted in October, according to the indexes computed by the National Industrial Conference Board. Increases in the cost of some major groups of expendi-

ture were offset by declines in others; the net result was a slight decrease of 0.1 per cent. Living costs in October were 3.7 per cent higher than in October, 1933, but 19.9 per cent lower than in October, 1929.

The purchasing value of the dollar was 123.6 cents in October as compared with 123.5 cents in September, 139.9 cents in April, 1933, and 100 cents in 1923.

Food prices declined 1.0 per cent from September to October which is contrary to the usual seasonal upward movement at this time of the year and also in sharp contrast to the increase of 4.4 per cent which took place from August to September. There has been an increase of 7.8 per cent in food prices since October, 1933, and a decrease of 28.0 per cent since October, 1929.

Rents continued their upward trend, rising 0.6 per cent from September to October, which made them 5.1 per cent higher than in October, 1933, but still 27.9 per cent lower than in October, 1929.

Clothing prices changed only to a small degree from September to October, both men's and women's clothing declining 0.1 per cent. While clothing prices in October were distinctly higher, namely, 25.8 per cent, than in June, 1933, when the upward movement in clothing prices was first observed, as compared with October, 1933, there has been a decline of 0.3 per cent and they were still 21.7 per cent below the level of October, 1929.

Coal prices advanced 0.2 per cent from September to October, less than is usually observed in the fall. Coal prices in October were 2.1 per cent higher than a year ago but 7.3 per cent lower than five years ago.

The index of the cost of sundries was 0.4 per cent higher in October than in September because of increases in the prices of admissions to motion picture

theatres, as well as in prices of tobacco and house furnishings. The data in regard to admissions to motion picture houses are obtained in October of each year. The cost of sundries in October was 1.5 per cent above that of October, 1933, and 6.5 per cent below October, 1929.—National Industrial Conference Board Release, Nov. 13, 1934.

MATERNAL WELFARE IN ITALY

AS a measure against the high maternal mortality rate in Italy, the Minister of the Interior has issued a circular to the various prefects urging them to establish sufficient prenatal centers and maternity hospitals and to investigate every death of a mother or baby during confinement or soon afterward. The Minister points out the importance of providing obstetric service at home, including the necessary materials for women of small means. For the improvement of the obstetric service the Minister urges the prefects to cooperate with the provincial branches of the National Bureau for Maternal and Child Welfare, giving special attention to rural communities.—*Difesa Sociale*, Rome, May, 1934.

DEATH OF PROFESSOR P. F. NICHOLS

THE University of California announces the death of Professor Paul F. Nichols, of the Fruit Products Staff of the College of Agriculture.

From 1918 to 1924 he was engaged in fruit and vegetable dehydration investigation of the U. S. Department of Agriculture on the Pacific Coast. From 1924 to 1926 he served as chief chemist in standardization investigations for the Sun-Maid Raisin Growers Association at Fresno, Calif. Since that time he has been in charge of fruit drying and dried fruit packaging investigations at the University of California in Berkeley.

He was a member of the American Public Health Association and delivered a paper at the Pasadena meeting which was published in the November *Journal*.

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